Army Implementation of
Integrated Product & Process Management
(IPPM)

SUCCESSFUL MANAGEMENT PRACTICES

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Integrated Product & Process Management
Working Group

PREFACE

The purpose of this report is to document the successful management practices developed by the U.S. Army Program Managers (PMs) in implementing the Integrated Product and Process Management (IPPM) concept. The information provided was gathered during on-site interviews with PMs from 22 Army systems, spanning all the Army programs from the helicopter to the radio and in various phases of the acquisition process.

The intent of this report is to provide the information accumulated during the survey and provide examples of successful management practices and/or benefits resulting from implementation of the IPPM concept.

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EXECUTIVE SUMMARY

In response to a changing defense environment, Dr. William Perry, then Secretary of Defense, directed the Department to apply the Integrated Product and Process Development (IPPD) concept of using Integrated Product Teams (IPTs) throughout the acquisition process. In his 10 May 1995 memorandum, "Use of Integrated Product and Process Development and Integrated Product Teams in Department of Defense (DoD) Acquisition", Dr. Perry emphasized the importance of IPTs as a mechanism that would allow the defense community to provide for a more efficient acquisition and management approach to weapon system development and fielding.

In 1995, under the auspices of the U.S. Army Materiel Command (AMC) Integrated Product and Process Management (IPPM) Working Group (WG), the U.S. Army Industrial Engineering Activity (IEA) investigated the Army's IPPM activities. Eight development programs that incorporated an IPPM approach or segments of that approach in managing their program were surveyed. IEA conducted a series of telephone interviews with functional organizations, project offices, and contractors to examine the character of the IPPM relationships between the Army and industry. The study results were documented in the "Army Efforts To Implement Integrated Product and Process Management (IPPM)", June 1995.

As a follow-on to the 1995 study, the AMC IPPM WG initiated a project to document the Army's successful management practices in implementing the IPPM concept. IEA developed and distributed a questionnaire to 40 Army PMs. The PMs selected were those who had participated in the previous study and/or managed an Army Acquisition Category (ACAT) I or II system. The systems selected spanned the Army programs from the helicopter to the radio. The questionnaire addressed IPPM/IPT experience levels, specific areas where IPPM/IPT activities had contributed to improving overall program performance, and the usefulness of the AMC Pamphlet 70-27, "Guidance For Integrated Product and Process Management", in establishing and managing IPPM/IPTs.

IEA then conducted on-site interviews at 22 of the 32 PMs who had responded to the questionnaire. Six of the eight programs from the previous report and ACAT I and ACAT II systems at various stages of maturity were selected. The maturity levels ranged from Advanced Technology Demonstration (ATD) to Acquisition Phase III, Production, Deployment, and Operational Support with the majority of the programs in Phase II, Engineering and Manufacturing Development (EMD).

The interviews were conducted with the PM or Deputy PM when he/she was available. The interviews were informal and typically consisted of a short presentation by the program office followed by questions from the survey team.

The survey teams found that the implementation of the IPPM concept was not uniform throughout the Army. The basic concepts however were found to be the same. The IPT methodology required leadership from management, a clear understanding of the ground rules and responsibilities of each member, training to function as a team, and well-established goals and objectives. The concepts for this report are categorized as IPT structure, training, meeting techniques, and decision making.

IPT STRUCTURE: The majority of the programs in Phase II, Engineering and Manufacturing Development (EMD) of the acquisition process had established an IPT structure within the program, whereas the programs in Acquisition Phase III, Production, Deployment, and Operational Support typically set up IPTs on an ad-hoc basis. The formal IPT structure typically involved three levels, an Executive Team, an Integration Team, and one or more Working Level Teams. The team size and the level of the

personnel varied depending on the tasking. Prime contractors and major subcontractors as well as representatives from the other services and other Major Subordinate Commands and agencies, such as the Defense Contract Management Command (DCMC), Defense Contract Audit Agency (DCAA), and the system users participated on all IPT levels. Where Foreign Military Sales (FMS) were involved, FMS representatives were also included.

TRAINING: Formal training of the IPT members was emphasized at all the program offices as paramount to the success of the IPT. Many noted that training improved IPT processes and team performance.

MEETING TECHNIQUES: Regularly scheduled meetings with detailed agendas, followed by meeting minutes summarizing topics discussed, the status of issues, and previously assigned action items were found to be the most successful. Typically, a "kick-off" meeting established the teams' goals/objectives and the roles and responsibilities of each team member. Once established, the IPT members communicated daily with each other, typically electronically, and held weekly and/or monthly meetings depending on the program. Frequent communication, both horizontally between members and vertically between IPTs, via face-to-face meetings, electronic mail, and video-teleconferencing was key to successful and timely decision making.

DECISION MAKING: Empowerment was found to be the most significant barrier to be overcome by the programs in implementing the IPPM concept. Many found that cooperation was easily attainable by selecting the "right mix of people" for the team. Although the teams are a mix of people with highly diverse backgrounds, if there is a mutual respect between members, cooperation does not seem to be a problem.

BENEFITS: The success of the IPT could not be attributed to any one factor, i.e., size, composition, meeting schedule, etc. Numerous benefits attributed to the use of the IPT process were reported by all programs surveyed. The one constant was open communications between all parties involved with the system, whether the contractor, other Government Agencies, or the user. The benefits reported included expedited problem solving, cost and schedule savings, and improved system performance.

Several programs reported significant schedule and/or cost savings: the **BCIS** program reported a 28 percent unit cost reduction; the **EFOGM** program reported schedule savings of more than 15 months between the previous Non-Line Of Sight (NLOS) Full Scale Development (FSD) effort and the current effort; the **Longbow Apache** program reported an accelerated Milestone Decision Review (MDR) III and the resultant favorable decision; the **Blackhawk** program increased commonality of design and repair parts, simplified maintenance procedures and reduced support equipment, which resulted in an overall program cost reduction; the **CAV** program reported a 2 to 2.5 percent increase in the established goal to reduce the vehicle weight by 33 percent; and the **SADARM** program reported a reduction in contracting time by three to six months.

The survey indicates that the IPPM concept is well established in the Army programs. The benefit is a more efficient acquisition and management approach to weapon system development and fielding.

INTRODUCTION

In response to a changing defense environment, Dr. William Perry, then Secretary of Defense, directed the Department to apply the Integrated Product and Process Development (IPPD) concept of using Integrated Product Teams (IPTs) throughout the acquisition process. In his 10 May 1995 memorandum, "Use of Integrated Product and Process Development and Integrated Product Teams in Department of Defense (DoD) Acquisition", Dr. Perry emphasized the importance of IPTs as a mechanism that would allow the defense community to provide for a more efficient acquisition and management approach to weapon system development and fielding. As a management process, an IPT integrates all activities from product concept through production and field support. The multi-functional team works to simultaneously optimize the product and its manufacturing and sustainment processes to meet cost and performance objectives. Day to day sequential decision making is replaced with a concurrent management team approach that uses the functional expertise of the team members.

Top DoD management began emphasizing the need to understand the acquisition process and its impact on the product as a whole. At a keynote address for DoD IPTs, Dr. Kaminski, the Under Secretary of Defense for Acquisition and Technology, identified critical changes that must take place in DoD in order for successful IPTs to be formed. He stated that DoD must move away from a pattern of hierarchical decision making to a process where decisions are made across organizational structures by IPTs.

In 1995, under the auspices of the U.S. Army Materiel Command (AMC) Integrated Product and Process Management (IPPM) Working Group (WG), the U.S. Army Industrial Engineering Activity (IEA) investigated the Army's IPPM activities. Eight development programs that incorporated an IPPM approach or segments of that approach in managing their program were surveyed. IEA conducted a series of telephone interviews with functional organizations, project offices, and contractors to examine the character of the IPPM relationships between the Army and industry. The study results were documented in the "Army Efforts To Implement Integrated Product and Process Management (IPPM)", June 1995.

The study showed the barriers to the team concept; team location, sharing of proprietary information, and dispute settlement were not insurmountable. Training, the establishment of ground rules up-front, and management support played an important role in overcoming all barriers.

As a follow-on to the 1995 study, the AMC IPPM WG initiated a project to document the successful management practices used by the Program Managers (PMs) in implementing IPPM and IPTs. The first step of this study was the identification of a baseline to begin documenting the successful management practices. IEA prepared and distributed a questionnaire (Appendix A) to 40 Army PMs. The PMs selected were those who had participated in the previous study and/or managed an Army Acquisition Category (ACAT) I or II system. The systems selected spanned the Army programs from the helicopter to the radio. These systems included six systems that had participated in the previous study, 22 (or 55 percent) were ACAT I systems and 10 (or 25 percent) were ACAT II systems. The questionnaire addressed IPPM/IPT experience levels, specific areas where IPPM/IPT activities had contributed to improving overall program performance, and the usefulness of the AMC Pamphlet 70-27, "Guidance For Integrated Product and Process Management", in establishing and managing IPPM/IPTs.

IEA received 32 responses, 80 percent of those surveyed. The results were: 94 percent of those responding had established IPTs; 63 percent of the IPTs had over 12 months of experience; and 62 percent of the PMs indicated that they had used the AMC Pamphlet 70-27. Of these PMs, 60 percent found the pamphlet to be valuable in establishing their IPTs. The areas where the IPT had contributed the most to improving overall

program performance were decision making, Government/contractor interaction, and program cost and schedule.

SYSTEMS SURVEYED

After analyzing the questionnaires, IEA elected to conduct on-site interviews at 22 of the 32 PMs who had responded. IEA focused on the six programs from the previous report and ACAT I and ACAT II systems at various stages of maturity. The programs are listed in Table I.

TABLE I

SYSTEMS SURVEYED

SYSTEM	ACAT STATUS	ACQUISITION PHASE
Abrams Tank	I	Phase III (Prod)
Battlefield Combat Identification System (BCIS)	II	Phase II (EMD)
Blackhawk	I	Phase III (Prod)
Bradley Fighting Vehicle System	I	Phase II (EMD)
Close Combat Tactical Trainer (CCTT)	II	Phase II (EMD)
Comanche	I	Phase I (EMD)
Command Control Vehicle (C2V)	II	Phase II (EMD)
Composite Armored Vehicle (CAV)	N/A	Phase 0
Crusader	I	Phase I (EMD)
Enhanced Fiber Optics Guided Missile (EFOGM)	N/A	Phase 0
Enhanced Position Location Reporting System (EPLRS)	II	Phase II (EMD)
Heavy Assault Bridge (HAB)	II	Phase II (EMD)
Improved Target Acquisition System for TOW (TOW ITAS)	III	Phase II (EMD)
Kiowa Warrior	I	Phase III (Sustainment)
Longbow Apache	I	Phase III (Prod)
Paladin 109A6 Howitzer	II	Phase III (Prod)
Patriot Advanced Capability (PAC-3)	I	Phase II (EMD)
Secure Mobile Anti-Jam Reliable Tactical Terminal (SMART-T)	I	Phase II (LRIP)
Sense and Destroy Armor (SADARM)	I	Phase III (Prod)
Single Channel Anti-Jam Manportable (SCAMP)	III	Phase III (Prod)
Single Channel Ground and Airborne System (SINCGARS)	I	Phase III (Prod)
Wide Area Munitions (WAM)	II	Phase II (EMD)

The TOW ITAS, Apache Helicopter, Bradley Fighting Vehicle System, CAV, CCTT, and the HAB were the six programs re-evaluated. These systems represent a broad spectrum of acquisition programs from new system development, CAV and CCTT, to the HAB, a non-developmental item. A summary for each system is provided in Appendix B.

Of the 22 systems surveyed, 50 percent are ACAT I systems, 32 percent are ACAT II, and 9 percent are ACAT III. The remaining 9 percent have not been given an ACAT status. The maturity levels ranged

from Advanced Technology Demonstration (ATD) to Acquisition Phase III, Production, Deployment, and Operational Support with the majority, 46 percent of the programs in Phase II, Engineering and Manufacturing Development (EMD).

Six survey teams led by IEA were established and assigned programs within a specific commodity area. The interviews were conducted on-site at the program office with the PM or Deputy PM when he/she was available. The interviews were informal and typically consisted of a short presentation by the program office followed by questions from the survey team.

UPDATE OF THE 1995 STUDY

On-site visits to six of the eight programs in the 1995 study were conducted to determine the IPTs progress since the last survey. Many of the PMs indicated that IPT structure and methodology had not undergone any significant changes. They had continued to use the methodology and believed that the process was beneficial to their programs.

Two programs have changed the structure of its IPTs in the last year, the **CAV** and the **CCTT**. The **CAV** IPT structure was changed to facilitate a more integrated product. The IPT structure, initially based on the system components, i.e., composites, armor, and signature management, was revised and the IPTs are now based on the system products, upper hull, lower hull, etc., to create a more integrated product. Additionally, the CAV IPT adopted Texas Instruments' methodology known as the Integrated Product Development Process (IPDP) as a model for their IPPM approach.

As the **CCTT** program moved into the hardware/software integration and test phase, the number of IPTs was reduced. Originally, the IPT structure included five teams organized by major system components. Currently, there are two teams, one addressing integration issues and the other focusing on completion of the developmental testing.

The CAV PM noted several areas where the IPPM methodology made a definite impact. The most notable is that the CAV program is 2 to 2.5 percent ahead of its goal to reduce the vehicle weight by 33 percent. Additionally, the costs for composites are now down to a ratio of 1.4 to 1 to the cost of the same product utilizing metal. A metallic vehicle costing $200K equates to a composite vehicle costing $280K. Although the cost is slightly higher, the savings in weight and logistics offset this difference.

Similarly, the HAB PM reported significant cost and schedule savings as a result of implementing the IPPM concept. This approach resulted in fewer Engineering Change Proposals (ECPs), fewer number of prototypes for Low Rate Initial Production (LRIP) from 38 to six, and about half the total man-hours required for the conventional approach.

SURVEY RESULTS

Even though DoD has only recently adopted the IPPM concept, the Army has been using the integrated team approach to resolve problems/issues for some time. The focus of this report is to document the Army's successes in implementing the IPPM concept. The successful management practices/techniques used by the various programs and the benefits realized as a result are presented. A summary of the successful management practices/techniques is in Appendix C.

The survey teams found that the implementation of the IPPM concept was not uniform throughout the Army. The basic concepts however were found to be the same. The IPT methodology required leadership from management, a clear understanding of the ground rules and responsibilities of each member, training to function as a team, and well-established goals and objectives. The concepts are categorized as IPT structure, training, meeting techniques, and decision making. Each will be discussed in detail.

IPT STRUCTURE

The majority of the programs in the EMD, Phase II of the acquisition process had established an IPT structure within the program. Generally, the IPT structure involved three levels, an Executive Team, an Integration Team, and one or more Working Level Teams.

The **Executive Team** known as the Executive Review Committee (ERC) for **BCIS**, the Executive Steering Group (ESG) for **TOW ITAS**, and the Program Management Team (PMT) for **PAC-3** are all similar, in that they are chaired by the PM or PEO. This team has senior level oversight and provides overall policy direction in all cases.

The **Integration Team** called the Management Working Group (MWG) by the **WAM, BCIS,** and **TOW ITAS** programs, and the Systems Integration Team (SIT) by **PAC-3** and **CCTT** programs, provides programmatic guidance and direction.

The **Working Level Teams** vary in number from two IPTs for the **WAM** (WAM Product Improvement Program and the WAM Low Rate Productions) to 35 IPTs for the **Comanche**. The Working Integrated Product Teams (WIPTs) for the **WAM** and **BCIS** and the Functional Execution Element (FEE) for **TOW ITAS** manage the daily program activity focusing on performance, schedule, cost, and supportability. These teams are established to handle problems/issues for all areas of a program from logistics to testing to engineering to contracting.

The Comanche and PAC-3 IPT structures are somewhat different, however, in that these programs have a four-level IPT structure. A mid-level IPT has been added to the overall IPT structure. The **Comanche** IPT structure includes: Tier 0, the executive leadership team co-chaired by the PM and the prime contractor (Boeing/Sikorsky) Program Directors; Tier I, the Boeing/Sikorsky Air Vehicle Integration Team; Tier II, analysis and integration teams assigned to perform program level tasks involving one or more IPTs; and Tier III, 35 IPTs with personnel from the appropriate functional disciplines.

The **PAC-3** IPT structure includes 18 lower level IPTs, six mid-level IPTs, a SIT, and a PMT. Three of the six mid-level IPTs are responsible for configuration item products and three are responsible for key developmental processes. SIT performs the system integration role and its members are the leaders of the six mid-level IPTs.

Unlike the programs in Phase II of the acquisition process, the programs in the Production, Deployment and Operational Support, Phase III of the acquisition process, establish IPTs on an ad-hoc, as needed basis. The **Blackhawk** and the **Apache Longbow** are two such examples. IPTs were established by both the **Apache Longbow** and **Blackhawk** programs to study applying commercial practices to the remanufacture of the AH-64A to AH-64D and the UH-60, respectively. Even though the IPTs were established on an as needed basis, the IPTs were similar to all others. The size and membership of the IPT, whether full-time or part-time, were based on the IPT purpose, a charter was established to define operating rules and responsibilities, and the IPT was managed by an oversight Executive Steering Group.

TEAM COMPOSITION

The team size and the level of the personnel varied depending on the tasking. In addition to the prime contractor and major subcontractors that participated on all IPT levels, several teams included representatives from the other services and other Major Subordinate Commands and agencies, such as the Defense Contract Management Command (DCMC), Defense Contract Audit Agency (DCAA) and the system user. Where Foreign Military Sales (FMS) were involved, FMS representatives were also included.

The **SMART-T** program deviated from the typical IPT structure completely. The SMART-T IPT consists of a Core Team and a Non-Core Team. The Core Team is a nine member team with members from functional areas within weapon system management, logistics, testing, engineering, etc. The Non-Core Team has over 50 members from a variety of functional areas such as legal, security, safety, etc. The Non-Core Team members provide matrix support on an as needed basis.

The composition of the **Paladin** IPTs is somewhat different than the others because of the uniqueness of the program. Since the DCMC provides general oversight of all production activities and is the accepted authority for the completed system, representatives are included on the Paladin IPTs. In addition, DCAA representatives are included.

Both the **CCTT** and the **Crusader** IPTs include representatives of the user of the product, the Training and Doctrine Command (TRADOC). These representatives, co-located in the contractor facility, are involved in all requirement trade-off studies, requirements analysis, and concept development.

IPT FORMALIZATION

The programs with the established IPT structure found that it was necessary to document the IPT ground rules, meeting guidelines, and roles and responsibilities of its members. This documentation took several forms: charter, partnering agreement, and Memorandum of Understanding (MOU). The **Comanche, Crusader, SADARM, PAC-3, HAB,** and **WAM** PMs chose to develop a formal charter to support and promote the IPT structure. The PATRIOT PM and the PAC-3 PM chartered 16 Government Product Integration Leaders to cover the IPT structure of the PAC-3 program. These PMs indicated that a charter was essential to a successful IPT.

The **SCAMP** and **BCIS** IPTs, on the other hand, chose to operate under a "partnering agreement" that promotes the achievement of mutually beneficial goals. The partnering guidelines include commitment to open communications and joint problem solving, sharing information at all levels, and accomplishing goals through mutual trust and open communications.

Similarly, the **Paladin** program operates under an MOU rather than a charter. The Paladin system is unique in that it involves a Government (program office) to Government (Letterkenny Army Depot) relationship in addition to the Government to contractor relationship. Because of this, the Paladin chose to establish a comprehensive MOU known as the Paladin Production Enterprise. The working level IPTs are established on an as needed basis to resolve problems.

CONTRACTOR IPTS

Some prime contractors also formed their own IPTs. Texas Instruments (**TOW ITAS**), McDonnell Douglas (**Apache Longbow**), General Dynamics Land Systems (GDLS)(**HAB**), Raytheon (**EFOGM**), Lockheed Martin Vought (**PAC-3**), and BMY and FMC (**C2V**) formed their own IPTs in addition to participating on the Government IPTs.

TRAINING

The importance of training the IPT members was emphasized at all the program offices. Many noted that training improved IPT processes and team performance.

The training varied from formal training developed and presented by a contractor to in-house Government training. Generally, the PMs favored professional training presented jointly to the Government and contractor members. The **Abram's** PM indicated that in-house training has its problems, particularly when a cascading method is used where training is from the top down. The problem is two-fold. First, getting the first level to receive the training is a major problem because of scheduling. Once they are trained, they train the personnel under their supervision. As it turned out, some trainers were better than others and this created the second problem. The quality of training deteriorated as it moved down the chain.

The **PAC-3** IPT members participated in a training course presented by the University of Alabama. In coordination with the Integrated Product Development (IPD) Executive Steering Committee, chaired by the Director of the MICOM Research, Development, and Engineering Center, the University of Alabama developed a three-day training program that could be tailored to individual programs or presented to the Redstone Arsenal community. They also received training in diagnostic control systems such as Earned Value Management (EVM), Technical Performance Measurement (TPM), and Critical Path Analysis (CPA). These management tools allow the IPTs to identify cost accounts and activities that deviate from the technical or performance measurement baselines.

The **Bradley** and the **SCAMP** IPTs took a similar approach to training and participated in a training program with the prime contractor. United Defense Limited Partnership (UDLP), the Bradley prime contractor, sponsored the joint training of Bradley IPTs presented by Texas Instruments. Similarly, the SCAMP IPTs participated in a training class sponsored by Rockwell International in addition to the Government sponsored IPT training they had received.

The **CCTT** program used consultants to help establish its IPTs. Three off-site training sessions were held for all team personnel. Training was provided on interpersonal skills and team participation, team missions, and charters. The principles presented included empowered multi-disciplined teams, a high level of user involvement, and life cycle product ownership.

In addition to the IPT training, **HAB** IPT members, both the Government and GDLS, attended training courses in cost-plus-award-fee contracting and in the use of Program Evaluation and Review Technique (PERT) charts. They also received extensive formal training for the various software tools they use in functioning as an IPT.

MEETING TECHNIQUES

The majority of the programs interviewed held regularly scheduled meetings with detailed agendas. Meeting minutes were prepared summarizing topics discussed, the status of issues, and previously assigned action items within two weeks following each meeting. The frequency of the meetings varied between the programs interviewed. Most held a kick-off" meeting to establish the teams' goals and objectives and the roles and responsibilities of each team member. Once established, the IPT members communicated daily with each other, typically electronically, and held weekly and/or monthly meetings depending on the program.

COMMUNICATION

All PMs attributed frequent communication, both horizontally between members and vertically between IPTs, via face-to-face meetings, electronic mail, and video-teleconferencing as the key to successful and timely decision making. Many programs used commercially available software: CaLANdar, to schedule meetings; electronic bulletin boards, such as Agent 32, to post documents, comments, etc.; and Netscape Navigator, a web browser to connect to information on the internet.

The **CCTT**, **Crusader, Longbow, PAC-3,** and **EFOGM** IPTs utilized the Contractor Integrated Technical Information Service (CITIS) as a means of electronically linking contractor and Government team members. CITIS creates a working environment for a dispersed team through the near real-time availability of data, common development tools, and integrated product data management. Joint utilization of this data base reduces the length of time for receipt and review of contract deliverables and the transmission of technical data and technical manuals between team members.

The **CCTT** PM reported difficulties in using the electronic tools initially. He indicated that successful utilization of electronic communications required the following: functional networks with sufficient bandwidth to allow the nearly instantaneous transfer of information throughout the IPTs; the use of a well defined set of software tools; and the full participation of all members in the electronic networking effort. One of the difficulties experienced on the CCTT program has been the inability of team members to overcome company policies on sharing of information across company and customer boundaries.

The **PAC-3** PM provided the following as the essential tools of an IPT that can be applied across the board to all programs: professional team facilitators/consultants; dedicated video teleconferencing facility; healthy TDY budget; e-mail; CITIS; and adequate conference rooms.

FOCUSING THE IPT

The survey teams found two programs, the **Kiowa Warrior** and the **Bradley,** which had a unique way of maintaining order during the IPT meetings. The IPT leader for the **Kiowa Warrior** IPT maintains order by utilizing a bowl of jelly beans. When the discussion becomes too heated and a member (or members) of the team becomes irate, he is instructed to take a jelly bean from the jar. This signaled other members of the team that the approach under consideration was too controversial and should be tabled and alternate solutions discussed.

The **Bradley** IPT leader selects a team member to act as the Sergeant of Arms. His/her duty is to keep the meeting on track, start and stop on time, and keep the conversation pertinent to the item on the agenda. At

the end of each meeting, the action items are reviewed to assure that the person responsible for an action item(s) is aware of his/her responsibility.

Another technique used by one of the **Abrams** IPTs to focus the meeting on the issues was to color code the presentations. The team uses three colors in preparing presentations, red, yellow, and green depending on the status of the action. The uniformity in the charts makes it easy for the team to grasp the significance of the action.

DECISION MAKING

In his presentation to the Industrial College and the Armed Forces: "The Defense Acquisition Challenge: Technological Supremacy at an Affordable Cost," in 27 January 1995, Dr. Kaminski stated that the two most important characteristics of an IPT are empowerment and cooperation. Empowerment was found to be the most significant barrier to be overcome by the PMs in implementing the IPPM concept. Many found that cooperation was easily attainable by selecting the "right mix of people" for the team. Although the teams are a mix of people with highly diverse backgrounds, if there is a mutual respect between members, cooperation does not seem to be a problem.

The **SMART-T** IPT found an interesting way to deal with resolving conflicts between team members on specific issues. They established a "Super Team" that was external to the IPT structure and composed of three functional division chiefs within PM Milstar. This "Super Team" would provide recommendations to the IPT to resolve the problem. The IPT could accept or reject the recommendation, but rejection meant returning to the table for further discussion.

The PM offices did not construe empowerment as a means for the PM office to overrun other offices. The emphasis was to make a decision in a timely manner. The PMs interviewed agreed that it was not necessary for each member to have absolute authority at the time of the IPT meeting, but that their authority limitations should be understood from the beginning. If concurrence by an immediate supervisor is required, that is acceptable if known by the IPT. Both the **Bradley** and the **C2V** IPTs had a situation where the decision of the IPT was reversed by a higher level representative at a subsequent meeting. Both PMs found that this problem could be overcome by using meeting techniques discussed above.

The **SMART-T** IPT operated under limited empowerment. The PM empowered the SMART-T IPT to make all decisions with full authority unless the decisions impacted cost, schedule, or performance. The PM directed that he be made aware of all decisions impacting these three areas.

The **Comanche** IPT found that using Technical Performance Measurement (TPM) focuses management's attention on critical elements of the program to assist in the decision making process. TPM is a management system that provides integrated program visibility of all aspects of actual versus planned technical performance over time. The TPM system provides for selecting, monitoring, assessing, and resolving variances of technical characteristics during definition, design, development, and test processes. Additionally, the IPT uses the Comanche Management Emphasis System, a formal means of identification, assignment, tracking and close out of program problems, areas of concern, and action items.

BENEFITS REALIZED

The survey teams found numerous examples of benefits attributed to the use of the IPT process during their interviews. A few examples are provided below.

The team concept has led to open communications between all parties involved with a system and has resulted in expedited problem solving, cost and schedule savings, and improved system performance. The specific details of each of the programs discussed are in Appendix C.

Using the IPT process resulted in a significant cost and schedule savings for the majority of the programs interviewed. The **BCIS, EFOGM, Longbow Apache, Blackhawk, Paladin**, and **SADARM** programs all reported schedule savings. Additionally, the BCIS program reported a cost savings resulting from the IPT effort. A **BCIS** IPT performed a Cost As An Independent Variable (CAIV) study to reduce the BCIS unit cost. The result was a unit cost reduction of 28 percent, from $16.91K to $12.1K. In terms of the overall program this amounts to a $35M cost savings.

The **Blackhawk** PM used the IPT process to maximize the commonality among various model H-60 helicopters. He established a team consisting of representatives from Army, Navy, Air Force, Coast Guard, FMS clients, and prime contractors. The study conducted by the IPT resulted in: increased commonality of design and repair parts; simplified maintenance procedures and reduction in support equipment; and overall program cost reduction.

The **EFOGM** PM attributed schedule savings of more than 15 months between the previous Non-Line Of Sight (NLOS) Full Scale Development (FSD) effort and the current effort to the IPT methodology. The NLOS FSD effort required 26 months and the Preliminary Design Review (PDR) is still incomplete, while the present effort which has been under contract for only 11 months is expected to complete the PDR within 30 days.

The **Longbow Apache** PM similarly credited the IPT process for the accelerated Milestone Decision Review (MDR) III and the resultant favorable decision.

Both the **SADARM** and the **Paladin** PMs utilized the IPT process in the most recent contracting initiatives. The **SADARM** PM estimated that utilizing the IPT methodology in the most recent contract negotiations reduced the contracting time by three to six months.

The IPT process has been extremely successful in solving problems that have arisen. When the **Kiowa Warrior** was judged unsafe, the PM established an IPT to investigate the allegation and resolve the problem. As a result of their investigation, the IPT presented several recommendations to improve the program. When implemented, the IPT's recommendations will reduce the aviator's workload and improve the performance and safety of the helicopter. Additionally, the IPT identified engine reliability improvements with a potential savings of $213M over a ten year period. Another IPT established to investigate a Congressional mandated Live Fire Test and Evaluation, recommended changes that resulted in a cost savings of $20M in planning costs and avoided the loss of several fully equipped aircraft, while still complying with the Congressional mandate.

The **Paladin** PM used the IPT process to resolve a problem before it developed into a larger problem. An IPT was established to study the requirements for "just-in-time" inventory. The intent was to determine

what was required to maintain a smooth flowing production schedule. The team identified parts, determined lead times, availability of parts, and a schedule to obtain those parts.

The **PAC-3** PM endorsed a novel approach using members of the IPT, Government and prime contractor personnel, for Interim Production Readiness Review (IPRR) of the subcontractor's facilities. The IPT members were intimately familiar with the program and were acquainted with the contractor personnel. As a result, the team required less of a learning curve and was more productive.

CONCLUSIONS

The Army has been successful in implementing the IPPM concept. The successful management practices/techniques found during the survey are documented in Appendix C.

Many of the programs interviewed during the on-site visits attribute expedited problem solving, cost and schedule savings, and improved system performance to the IPTs. The implementation of the IPPM concept, however, has not occurred without overcoming barriers such as team location, communication, socialization of team members, etc.

Even though the implementation of the IPPM concept was not uniform throughout the Army, the basic principles were found to be the same. The PMs agreed on the following:

A formal document, whether a charter, partnering agreement, or MOU is necessary to specify the IPT ground rules, meeting guidelines, and roles and responsibilities of its members.

IPT goals and objectives must be established and tracked.

Training to function as a team is paramount. Many of the early conflicts and struggles could have been avoided/reduced with training in decision making processes and resolving conflicts.

Communication is the key to an effective team. There is a need to constantly work at improving team communication/integration. An integrated network of communications/software tools is mandatory.

The team should consist of members from all those involved with the system from the contractor to the user. Team members must clearly understand their roles and responsibilities and participate in the decisions.

Barriers between the functional disciplines must be overcome. Team members must be compatible if a cooperative atmosphere is to exist.

The AMC Pamphlet 70-27 is helpful in implementing the IPPM concept. Sixty-two percent of the PMs surveyed reported using the pamphlet.

APPENDIX A

QUESTIONNAIRE

DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY MATERIEL COMMAND
5001 EISENHOWER AVENUE, ALEXANDRIA, VA 22333 - 0001

REPLY TO
ATTENTION OF

31 JUL 96

SARD-RP

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Integrated Product and Process Management (IPPM) Best Practices

Reference U.S. Army Materiel Command (AMC) IPPM Working Group (WG) Study Report titled "Army Efforts to Implement Integrated Product and Process Management (IPPM)," June, 1995.

As you use the concepts of IPPM and Integrated Product Teams (IPTs), best practices will emerge. Under the auspices of the AMC IPPM WG, the U.S. Army Industrial Engineering Activity (IEA) is undertaking a project to identify, document and publicize these best practices. This project is a follow-on to the referenced study. With your help, they will begin building a library of best practices which will be useful to your current and future programs.

As a first step, I request that you complete the enclosed short survey about your IPPM and IPT experiences. Completed surveys will be used to decide where to begin gathering best practices. The IEA will then start documenting the identified best practices by working with your staff and contractors and may contact you to arrange for an on-site visit before the end of FY96. I am very interested in the progress you have made in implementing IPPM/IPTs and believe it is vitally important to document best practices in this area for everyone to use.

Completed surveys are needed by August 16, 1996, and can be provided by mail, fax or e-mail to U.S. Army Industrial Engineering Activity, ATTN: AMXIB/IPPM Team; FAX: DSN 793-7170; e-mail: glomax@ria-emh2.army.mil. If you have questions about the survey or the project, please call Mr. Gary Lomax, DSN 793-6167 or Commercial (309) 782-6167, or Mr. Ferenc Beiwel, DSN 793-7816 or Commercial (309) 782-7816.

The point of contact for this action is Mr. Gil Langford, Headquarters, U.S. Army Materiel Command, AMCRDA-TE, DSN 767-5638 or Commercial (703) 617-5638.

KENNETH J. OSCAR
Deputy Assistant Secretary of the Army
(Procurement)

INTEGRATED PRODUCT AND PROCESS MANAGEMENT
BEST PRACTICES SURVEY

1. System name:

2. POC name, phone number and e- mail address:

3. Acquisition phase and date of last Milestone Decision Review:

4. Check months of IPPM/IPT experience: 0-5_____ 6-12_____ 13-24_____ over 24_____.

5. Check areas where your IPPM/IPT activities have contributed to improving overall program performance and you feel best practices can be documented:

___Decision making
___Milestone Decision Reviews
___Design/development Reviews
___ Trade- off studies
___User acceptance
___Product producibilitv
___Product supportability
___Government/contractor interact ion
___Program cost
___Program schedule
___How and when to establish IPT (MOU, contract, etc.)
___Organizational level and diversity
___Tools/resources (hardware, software, etc.)
___Staff/training
___Organizational and matrix support
___Legal liability (Government- contractor teaming)
___Proprietary information transfer and protection
___Others (Please list)

6. Do you have any best practices already documented? (If yes, please attach)

7. AMC-P 70 -27, Guidance For Integrated Product And Process Management:

a. Does your staff use it? Yes ____. If no, why not?

b. How valuable has AMC-P 70-27 been to your staff?
High____ Medium____ Low____ Limited _____Not Applicable____

APPENDIX B

UPDATES OF THE 1995 STUDY RESULTS

BRADLEY FIGHTING VEHICLE SYSTEM

CLOSE COMBAT TACTICAL TRAINER (CCTT)

COMPOSITE ARMORED VEHICLE PROGRAM (CAV)

HEAVY ASSAULT BRIDGE (HAB)

AH-64D LONGBOW APACHE

TUBE LAUNCHED OPTICALLY TRACKED WIRE GUIDED (TOW)
IMPROVED TARGET ACQUISITION SYSTEM (ITAS)

BRADLEY FIGHTING VEHICLE SYSTEM

The **Bradley Fighting Vehicle System** family consists of the M2/M2A1/M2A2 Infantry Fighting Vehicle (IFV) and the M3M3A1/M3A2 Cavalry Fighting Vehicle (CFV). The armored, fully tracked IFV and CFV provide cross-country mobility and vehicle mounted fire power to mechanized infantry and cavalry units. The IFV/CFV vehicles are the complement to the M1 Abrams tank in the combined arms, close combat task force.

Vehicles with the new M2A3/M3A3 configuration will be able to conduct digital command and control operations with the Abrams tank. There will be seven major upgrades that use the latest technologies; electronic architecture command and control, thermal sights using the second generation forward looking infrared, fire control, navigation, commander's viewer, and embedded training built-in diagnostics.

Vehicle armament consists of a fully stabilized M242 25MM automatic gun, a TOW missile system, and a coaxially-mounted 7.62MM machine gun. A 600 horsepower engine/transmission propels the vehicle up to 38 miles per hour. The vehicle incorporates improved armor protection, spall protection liners, more stowage, laser finder, compass/navigation subsystem, missile countermeasure device, and antifratricide system.

The upgrade effort to the A3 version is now in the EMD phase of the acquisition process. The A3 is a major defense acquisition program under ACAT IC. The ASARC decision to enter LRIP will be held in June 1997 while the approval for production will be held in November 1999.

The Army awarded the $240 million EMD contract to the UDLP in May 1994 and did not require the use of IPPM.

The Bradley PM is the nominal Government IPPM team leader. Government IPPM members are also members of United Defense Limited Partnership's (UDLP) Product Development Teams (PDTs). The teams are organized along functional lines with selected functional areas assigned to each PDT. Each Government member represents a functional area on all PDTs. For example, the Government software engineer is a member of three PDTs. Most of the PDTs have seven to eight Government team members.

UDLP purchased the Texas Instrument's (TI) Integrated Product Development Process (IPDP) and has incorporated it into a corporate-wide policy. The IPDP concept being used has its roots in the document, "The Role of Concurrent Engineering In Weapons System Acquisition". UDLP uses teaming in three levels:

LEVEL I - The Core Team, chaired by the A3 PM, focuses on the highest level of program execution. The Core Team tracks overall program progress and establishes policy.

LEVEL II - The Leadership Team provides program guidance and consists of representatives from all functional areas including the PDT leaders. The Leadership Team focuses on the process used by the PDTs to assure consistency and adherence to contemporary organizational effectiveness principles.

The Systems Engineering and Integration Team (SEIT) provides technical guidance and consists of managers of the technical functional areas and PDT leaders. The SEIT leader is the A3 engineering manager. The team focuses on technical issues that cross PDT boundaries.

LEVEL III - The PDTs do the focused development work. The teams are organized along functional lines and are responsible for overall A3 integration. Each team has designated leader and multi-disciplinary members to include UDLP, subcontractor, and Government personnel.

Special Sub-PDT teams conduct special projects related to resolving a specific issue on an as needed basis. The teams normally address a specific issue and then disband when the problem is resolved.

The teams interrelate. Customer requirements drive the work through the system engineering PDT down to the other PDTs. The requirements break down into engineering tasks and specifications to be developed and integrated by each PDT. The system integration PDT handles the final integration. The SEIT handles program technical issues and the PDT leadership team handles process issues.

UDLP's PDT concept began in 1993. The original concept was a **"Better way of doing business".** Bradley Project Management Office personnel were members of the PDTs. The teams had their own goals. UDLP's formal commitment to IPPM began 20 February 1995 when they adopted TI's IPDP into their company policy. UDLP held a workshop, including Government representatives, to introduce the process.

The primary role of the Army team is to support the UDLP PDTs. Government members add value to the teaming process in two primary areas; helping to understand the Army requirements and making the team aware of integration issues involving other teams. The Government team meets once or twice a month, depending upon travel schedules. The Bradley PM usually chairs the meeting. The purpose of the meeting is to update all team members on the overall status of the program and to resolve any problems.

The UDLP PDTs meet every week which makes it impossible for a Government member to attend every meeting. PM Bradley has a technical representative, permanently located at UDLP, who attends the Leadership Team, SEIT, and approximately half of the PDT meetings. He provides feedback and coordination with other Government representatives on a daily basis.

Even though physical travel to UDLP is still the primary method of communication, the program office is on the UDLP voice mail system. The Joint Computer-aided Acquisition and Logistics Support (JCALS) system and the Digital Storage and Retrieval Engineering Data System (DSREDS) have also been incorporated into the Bradley program office.

Government members of all PDTs participate in the Milestone Control System (MICOS) meetings held quarterly. The meetings last 2-3 days and are usually chaired by the Bradley PM. The Government or the UDLP representative of the various PDTs are the speakers. The purpose of the meeting is to update all team members on the overall status of the program and to resolve problems. Members of the Army Secretary Acquisition Review Council (ASARC) overarching IPT are also invited to the MICOS meeting.

Expenditure tracking is one of the primary tasks of each Government team member. The costs are broken down into small manageable work cells identified with the work breakdown structure. After each trip, the Government team member manages and reports cost performance on a monthly basis.

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CLOSE COMBAT TACTICAL TRAINER (CCTT)

The **Close Combat Tactical Trainer (CCTT**) is a collective training system. Armor and mechanized infantry units man full-crew weapon system simulators to conduct unit training in a combined arms environment. Simulated elements replicating combat vehicles, weapons systems, and command and control elements are networked using Distributed Interactive Simulations (DIS) protocols for real-time, fully interactive, collective task training on computer generated terrain. The CCTT system will support maneuver company commanders in planning, conducting, and reviewing their unit's training on a free play, computer-generated synthetic battlefield. The CCTT is based on Defense Advanced Research Projects Agency (DARPA) proof of principle work and the Army Simulations Network (SIMNET) program which proved the feasibility of networking a set of training systems similar to the Conduct of Fire Trainer to emphasize collective, rather than individual war fighting skills.

A CCTT training site will be composed of simulator modules, work stations, a computer network and the associated software required to accomplish training. Simulator modules will be provided for the M1A1, M1A2, M2/M3A2, M113A3, M981, and HMMWV tactical vehicles. A Dismounted Infantry module will provide training stations for the platoon leader and two squad leaders. The functions of the Battalion Operations Center, control of the Semi-Automated Forces (SAF), i.e., the virtual contingent of the battlefield, and control of the overall training system will be provided by work stations which allow access to the simulated battlefield.

The CCTT development is an ACAT II program that is currently nearing the end of the EMD phase. A MDR III decision for full production is expected in FY98 following a successful completion of the IOT.

IPPM concepts have been utilized since the beginning of the CCTT program. Initially, personnel from six teamed contractors and many Government agencies formed five teams. Under the guidance of the SIT, individual teams addressed the development of the simulator modules, the visual system, the SAF, and the workstations. The combined membership of these teams, collectively known as the CCTT Integrated Development Team, was given training which addressed basic team principles and the processes and procedures that would be used during the program. These teams were provided with charters empowering them, within the bounds of contract requirements and program constraints, to design and develop their individual portions of the CCTT system. In addition, a number of cross-team working groups were formed to address issues which were common to more than one team.

The processes implementing the IPT concept on the CCTT program have gone through a number of changes since the beginning of the program. During the early years, the processes and procedures were refined and reworked when needed. Examples of the these changes included a gradual formation of more working groups to address individual program issues as they surfaced during the development effort. Later, following a Process Action Team (PAT) study on the Concurrent Engineering Process, mandatory meeting attendance was reduced when the amount of time being spent in meetings began to limit the workers' ability to complete their tasks. Weekly focus meetings, at both the lead engineer and the program management levels, were instituted to provide a forum in which to highlight and resolve issues that were troubling the individual teams. A clarification of roles occurred when the Government team members developed a set of guidelines limiting their responsibilities as team members.

In the last year, the program moved into the hardware/software integration and test phase. In response to this change in program emphases, the original five teams have been restructured into two teams, one addressing integration issues and the other focusing on completion of the developmental testing. Both of the current teams have benefited from the existing working relationships, the knowledge of program practices and the extensive program background the team members gained while on the original teams.

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COMPOSITE ARMORED VEHICLE PROGRAM (CAV)

The Army Research Laboratory (ARL) completed the first step in the **Composite Armored Vehicle (CAV)** program - proving the feasibility of using thick composites as structure and armor for combat vehicles.

The CAV is now an ATD. The Army Tank-Automotive Research, Development and Engineering Center (TARDEC) is using 6.3 funds to build the CAV ATD. The CAV ATD is a non-system specific 22 ton tracked vehicle, slightly smaller than the Bradley Fighting Vehicle, and uses a 105MM XM35 tank gun as a force generator.

The Army awarded a $50 million Cost Plus Fixed Fee (CPFF) contract to the United Defense Limited Partnership (UDLP) in December 1993. The contract schedule included a PDR in April 1995 and a Critical Design Review (CDR) in December 1995. The contractor will deliver the vehicle for testing in February 1997. A 6,000 mile durability test will be conducted at Aberdeen Proving Ground, MD in March 1997. The vehicle, training requirements, and tools will be ready at that time. The original contract had only a brief coverage of IPPM. A subsequent modification, however, included additional provisions for IPPM and funds for IPPM training. IPPM provisions flowed down to major subcontractors, including Hercules and Lockheed.

Four functional development teams manage the program. Personnel initially interviewed were Government members of the Composite Structures Development Team (CSDT). The other three teams involved are the Armor, the Signature Management and System Integration Team. The follow-up survey team interviewed the Associate Director, Advanced Systems Concepts & Planning.

The CAV IPT structure has been changed since the initial interview to enhance the flow of information. The initial organization was based on the system components (composites, armor, signature management) with integration being separate. The revised IPT structure was organized by product (upper hull, lower hull, etc.). The new configuration provided a much more integrated product.

The CSDT is a true IPT, as it includes representatives from three ARL directorates, TRADOC, DCMC, the test and evaluation community, and UDLP. The CAV does not have a PM since this is a science-technology based program. Instead, the TARDEC Development Business Group heads the program. The UDLP efforts dovetail with those of TARDEC. They have established sub-teams for the upper hull, the lower hull, the crew compartment, and for ramps and joints.

The CAV is TARDEC's first implementation of the IPPM methodology and motivation is extremely high. The IPT started in August 1993. The team wrote the RFP and staffed it within TARDEC. They asked industry for comments. Members representing IPPM interests participated on the Source Selection Evaluation Board (SSEB).

A Texas Instruments (TI) system, Integrated Product Development Process (IPDP), was adopted as the model for the IPPM methodology now in use. The TARDEC and UDLP management tailored the TI package to the CAV to determine the requirements. Next, the intermediate managers tailored the package to determine "how" the program would be executed. They hosted a workshop that paved the way for a detailed tailoring of the package and implementation. The tailored document (approximately 1,000 pages) was purchased from TI under a licensing agreement for $150,000. CAV managers have been using this document for two years. It is the single source document for the entire CAV program. TARDEC is now in

the process of adding a section on RFP preparation to this IPPM document. TARDEC also provided a copy of the IPPM document to the Survey Team.

Army interaction with UDLP and the entire Government/contractor team is frequent. Daily phone calls, monthly co-chaired meetings, quarterly In-Process Reviews (IPRs), and e-mail keep both parties in touch. The e-mail system has extra features making it possible to transfer engineering drawings and various reports, manipulate them, and approve their status. Its virtual workplace capabilities are especially important in view of the three hour time separation between TARDEC and UDLP team members. Since e-mail is so widely used, TARDEC has dedicated a computer as a depository for CAV-related data.

The following are results of the follow-up survey conducted on 21 December 1996, which highlights new innovations, current progress, and areas where IPPM has made a definite impact on the smooth development of the CAV program.

- The CAV effort is an activities-driven program, not a schedule-driven one, which makes it more flexible than it would if it were driven by a rigid schedule.

- The cost for composites is now down to a ratio of 1.4 to 1 compared to the cost of the same product utilizing metal. For a CAV type vehicle this equates to a cost for the structure and armor of $200,000 for an all metallic vehicle compared to $280,000 for a composite solution. While slightly higher in cost, savings in weight and logistics offset this difference.

- The CAV program is 2 to 2.5 percent ahead of the established goal to reduce the vehicle weight by 33 percent.

- The CAV program utilizes Computer-Aided Design (CAD) techniques in creating three dimensional designs and mock-ups, similar to those used at Boeing in the B-777 program.

- UDLP was able to reduce the number of changes per drawing from two down to .53 changes per drawing. This effort is directly attributed to IPPM and netted a savings of $240,000 on this program.

- TARDEC spent approximately $800,000 in conducting workshops for the teams (Government, contractor, management, subteams, etc.) to bring all of the players into the effort. A payback to this investment in training has resulted in a savings of $1.2M in Scope Of Work (SOW) changes alone. An example of this up-front approach was the elimination of a 25 mile per hour reverse speed requirement for the transmission. This alone saved approximately $250,000. These workshops have trained approximately 90 key team members and other personnel. More time has been spent up front with the CAV program than any other TARDEC program.

- At the System Design Review (SDR) point of the program, the lower hull was 500 pounds overweight. It was also expensive and complex to manufacture. By using the full blown IPPM effort, the CAV Team reduced the weight by over 500 pounds, reduced the number of major parts from five to three, while at the same time reduced piece cost by $45,000.

- The CAV program utilizes the IPPM methodology which results in "Paths Not Taken." This in turn saves time and money. This is a unique approach that costs slightly more initially but saves more dollars in the long run by eliminating dead ends and having to go back and re-think and re-design systems and sub-systems, resulting in savings, both in time and dollars.

- Although IPPM was implemented in the CAV program six months after contract award, only one contract modification has been required.

- The CAV program relies heavily on the use of the Action Item List.

- The CAV program methodology can assist other programs and PMs in the reduction of system weight. The weight savings is for the most part due to the use of lightweight materials. CAV management believes that by using IPPM, they maximized weight reduction.

- Lessons learned in the CAV program are applicable to other programs.

- Integrated Logistics Support (ILS), manufacturing, and design are all working smoothly, due in great part, to the implementation of IPPM. Working together was key and in the case of the CAV (and as a general tenet of IPPD) they were done concurrently, not serially.

- The CAV program uses the critical path approach. CAV management was able to get rid of mistrust early on and the teamwork is excellent. They simply laid down the guidelines and let people do their jobs. The Government team members had responsibility for completion of tasks on the Contractor's critical path.

- If IPPM had not been implemented, TARDEC estimates that the CAV program would be six months behind schedule and would have a cost overrun of between $2M to $5M.

- The CAV program has been singled out as the best of the R&D programs due primarily to the use of the IPPM methodology. It is one of the top three DoD ATD programs.

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HEAVY ASSAULT BRIDGE (HAB)

The **Heavy Assault Bridge (HAB)** consists of a bridge and launch mechanism mounted on an overhauled, converted Abrams Tank chassis. It has mobility characteristics comparable to the maneuver forces it will support and will provide Military Load Class 70 vehicles the capability to cross 24-meter gaps (26 meters bridge).

The HAB is an NDI and ACAT III program. The HAB program is under the direction of the Program Executive Officer, Armored System Modernization and managed by the Product Manager, HAB.

The HAB is currently in the acquisition phase, Phase II EMD. As a result of competition, the Army selected the General Dynamics Land Systems (GDLS) concept for the EMD phase and awarded the EMD II contract in January 1994.

Upon successful testing of the initial test vehicles, the Government awarded a contract for the first six LRIP vehicles that will be used for the Production Qualification Tests (PQT) and Initial Operational Tests (IOT). After MDR and approval, a multi-year contract for the remaining LRIP quantities will be initiated by 4QFY97. The contract will be sole source to GDLS.

The first unit equipped target date is 4QFY00. The schedule anticipates the MDR III in 2QFY00 and award of the full rate production contract in 3QFY00. Full rate production will consist of an additional 530 vehicles to be manufactured at a rate of thirty vehicles per year.

The HAB Product Management Office (PMO) organized its staff to operate in an IPPM mode with GDLS. The PMO established an IPT which consisted of a team of ten to thirteen people. The IPT consists of representatives from various fields such as engineers, logisticians, contracts, etc., from both the Government and GDLS. The Engineer School's, TRADOC, represents the User and attends all of the monthly program meetings and other major reviews and demonstrations. A Special Sub-IPT is made up of the Engineer School's personnel which also evaluates the design as it progresses.

The basic role of the IPT is to review designs and plans as they develop. Immediate feedback is provided rather than waiting for periodic reviews and analysis of deliverables. This provides results that are more suitable to the program and avoids waste of time and money in pursuing approaches that would have to be changed later.

GDLS is using the IPT approach within its own office to include their major subcontractors. Permanent members of the GDLS IPT are functional element managers. Major subcontractors for the HAB are MAN/Gutehoffnungshutte Gmbh, manufacturer of the bridge, Stewart and Stevenson, manufacturer of the hydraulic power unit, and Caterpillar, manufacturer of the stabilization blade. The functional element managers are responsible for execution of the contract and draw on people from their respective organizations as needed. People with appropriate skills organize into subteams to focus on specific parts of the design, corresponding to the work breakdown structure. This breakdown may be at the system, subsystem, or detail level. The GDLS facility hosts the team meetings.

The ground rules for the Government-contractor interaction are simple and clear. GDLS is responsible for providing a product that meets the contract requirements. The Government is responsible for providing recommendations and evaluations as the designs and plans progress.

Members of both the Government and GDLS teams took training courses in cost plus award fee contracting and in the use of Program Evaluation and Review Technique (PERT) charts. The functional managers serve as the facilitators for the subteams. The members received extensive formal training for each software tool they must use and learned the rest by participating in the subteams.

Government personnel participate regularly in the IPT meetings that GDLS holds. This works well because the HAB PMO is only two miles from the GDLS facility. Both Government and GDLS participation is tailored to provide skill levels required. A subteam frequently begins its work with a brain storming session which then walks through the design, creates manufacturing process flows, positions machines and determines manufacturing process limitations. The result is a producibility package which contains design constraints, manufacturing process limitations, logistics impacts and design recommendations

The GDLS Cost and Schedule Status Report (CSSR) track costs. Costs can be tracked to the fourth level of the work breakdown in the CSSR. Government personnel analyze the CSSR carefully to identify overruns, under runs and schedule variance and deviations with the GDLS personnel.

GDLS found the HAB cost and schedule requirements for EMD II extremely challenging and decided that the IPPM approach was the way to meet these requirements. This approach resulted in significantly fewer ECPs, fewer prototypes, and about half the total man-hours required for a conventional approach.

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AH-64D LONGBOW APACHE HELICOPTER

The **AH-64D Longbow Apache** developmental program is an ACAT ID upgrade to an existing system. During August 1996, a five year $1.9B contract was signed to remanufacture 232 of the planned 758 aircraft to the AH-64D configuration. The contract includes acquisition of 32 training devices, pre-modification of 108 aircraft with options for an additional 108 aircraft, an initial training program, contractor configuration management, contractor logistics support for AH-64D unique items for a five year period and a performance based warranty. As of September 1996, 18 aircraft were in various stages of the re-modification process at the contractor site. First delivery is March 1997 and the first unit equipped date is July 1998. The Longbow Fire Control Radar (FCR) is currently in the first year of production. Delivery of the first 10 FCRs will coincide with the first AH-64D deliveries in March 1997. A total of 227 radars are planned for procurement and fielding.

McDonnell Douglas Helicopter Systems (MDHS) in Mesa, AZ is the prime contractor for the airframe upgrade and system integration efforts. They are responsible for the design and production of the upgraded aircraft. Since this program began before the IPPM methodology was developed by DoD, there are no contract requirements for its use.

At their own expense, MDHS formed eight component focused IPTs (one for each subsystem under redesign) with a high level IPT to serve as an overall system integrator. Each subsystem IPT had members from all functional areas. Similarly, the integration IPT included members from the subsystem IPTs with other functional area members as required. In cases of purchased subsystems or components, the component supplier also became a team member. Subsystem teams met as needed, while the integration IPT met weekly. MDHS made agreements with suppliers where they were guaranteed production contracts if they achieved a design that met MDHS's performance, cost, and reliability goals.

MHDS used CAD systems to create and transmit designs between team members and between teams. They used the CAD system to create an Electronic Development Fixture where designs could be analyzed for physical interfaces and tooling development. Off-site suppliers received CAD designs via modem using the Initial Graphics Exchange Standard (IGES) format data files. The program office was not able to participate in this electronic exchange, however, due to a lack of compatible technologies.

The results achieved by MDHS's IPTs have been impressive. Component redesign has led to a weight reduction of 246 pounds per aircraft, a design-to-unit-production cost reduction of $139K, a maintainability improvement of 44 percent, and a reliability improvement of 18 percent.

Because the contractor self-funded the redesign efforts, the Government did not participate actively on the IPTs, nor did they make any changes to their traditional oversight structure or methods. The Government saw the results at design reviews and program progress reviews, but no Government personnel attended team meetings. MDHS feels that the Government should participate on the IPTs in their role as the customer, not as a working member of the team. If Government personnel were working members, MDHS wasn't sure how work assignments might be split between the contractor and Government team personnel.

MDHS intends to make greater use of IPTs in future contracts. Notwithstanding the absence of a quantitative cost/benefit analysis, they agree it definitely costs more to use the IPPM methodology than the traditional serial development methods. The improvements in production costs, maintainability, and reliability, coupled with the reduction in development time make IPPM a favored business strategy.

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TUBE LAUNCHED OPTICALLY TRACKED WIRE GUIDED (TOW) IMPROVED TARGET ACQUISITION SYSTEM (ITAS)

The **Tube Launched Optically Tracked Wire Guided Improved Target Acquisition System (TOW ITAS)** is a materiel change, technology insertion to accommodate TOW 2 on the High Mobility Multipurpose Wheeled Vehicle and ground mount systems. ITAS provides improved target detection and acquisition range, improved probability of hit, and enhanced fire control capabilities that will upgrade the anti-armor punch of light forces. Features include a second generation forward looking infrared detector to extend the ability to detect and recognize targets, a day sight, aided target tracking, automatic boresighting, range finder, embedded built-in test/built-in test equipment, and embedded training. The ITAS accommodates all TOW missiles and has provisions to accommodate future new missiles. The ITAS is an ACAT III program but, in the area of test and evaluation, it receives OSD oversight. The ITAS project is under the direction of the Program Executive Officer (PEO), Tactical Missiles. The TOW ITAS PM reports to the Project Manager, Close Combat Anti-Armor Weapons Systems (CCAWS).

The Army competitively awarded an EMD contract to Texas Instruments (TI), Dallas, TX on 30 April 1993. The PDR concluded in October 1993 and the CDR in September 1994. Both reviews were event, not schedule, driven. Satisfactory completion of predetermined milestones along paths to discrete events brought both reviews to a successful closure. TI delivered three prototypes for test and evaluation. Preproduction Testing and Limited User Tests were completed. Four more prototypes were delivered by January 1996 for Preproduction Qualification Testing. A pilot line proved out production processes, work instructions, tooling and test equipment. The first units from the pilot line in April 1996 supported the IOT. July 1996 marked the Milestone IIIA decision.

An appointed team of Government personnel wrote the TOW ITAS RFP. They streamlined the RFP and organized it to address program management, design, configuration management, production, and test. The resulting RFP did not have separate sections for each of the traditional areas. The RFP did request that the contractor organize a Concurrent Engineering (CE) team to execute the EMD contract. There were no limitations imposed on how the team was to be organized. The TI proposal outlined their CE team organization. An AMC Roadshow II reviewed the RFP and provided comments to the CCAWS PMO in the fall of 1992.

The PEO, Tactical Missiles organized and chartered a Joint Industry-Government Team TOW ITAS, to define, plan, control and direct critical processes in EMD and production. They enrolled all functional disciplines, test and evaluation agencies, and the user in Team TOW ITAS. The scope of team activities included identification and continuous improvement of processes critical to program success. The team had to ensure: synchronization of program activities; open, rapid, communications; real time problem solving; and application of appropriate skills, resources, and timely management decision. However, the team could not alter independent evaluator's missions in any way nor could they usurp the Test and Integration Working Group's (TIWG) prerogatives. Three elements compose the team: the Executive Steering Group (ESG); the Management Working Group (MWG); and the Functional Execution Element (FEE).

The ESG provides senior level oversight and overall policy direction. The PEO, Tactical Missiles is the chair. Members include: representatives from the Offices of the Deputy Undersecretary of the Army for Operations Research; Commander, U.S. Army Missile Command (MICOM); Commandant, U.S. Army Infantry School (UASIS); senior level management representatives from the U.S. Army Materiel Systems Analysis Activity (AMSAA), Operational Test and Evaluation Command (OPTEC), and Night Vision and

Electronic Sensors Directorate (NVSED); and the contractor vice president. The ESG meets annually or more often as required.

The MWG provides programmatic guidance and direction. The PM, CCAWS is the chair. Members include a director level contractor representative and, generally, director level representatives from MICOM, USAIS, AMSSA, OPTEC, NVESD, and other organizations that have direct involvement or oversight responsibility for the program. The MWG meets semi-annually or more often as required.

The FEE manages daily program activity, focusing on performance, schedule, cost, and supportability. The FEE is responsible for early problem identification and course of actions recommendations. The FEE addresses the ESG/MWG via the TOW ITAS PM. Its normal forum is the daily workplace and the management interchange meetings. The FEE has both Government and contractor representatives from all the functional areas. Also included are representatives from the Defense Plant Representative Office (DPRO), USAIS, AMSSA, OPTEC, and other organizations. The FEE does not meet as a complete entity after the initial kick-off meeting so FEE members are kept abreast of activity through the MWG and the TOW ITAS Product Manager channels. The PM sponsors weekly meetings of key personnel at Redstone Arsenal.

Soldier users have been an integral part of the ITAS project. A user representative served on the Source Selection and Evaluation Board. An early Users Demonstration in August 1993 at Fort Benning and Redstone Arsenal included appropriate Military Occupational Specialty representatives. The demonstrations allowed soldiers to evaluate prototypes and concepts as a part of the path to the PDR. Ongoing Limited User Tests provide user evaluation early in the project. A user also participates in the MWG and ESG meetings.

The entire FEE team met together for a one-time kick-off meeting about one month after contract award. The meeting held at the contractor's facility lasted one week. The TOW ITAS PM started the meeting by laying ground rules for the project and instructing the team what to accomplish. The contractor presented a briefing to over view the contract and their top level plans for executing it. After the contract briefing, the Government and contractor FEE members met in groups with their functional counterparts. As instructed, the team members got to know each other, and line by line, perused those parts of the contract relating to their areas of responsibility. They had to understand the contract and agree about what was to be done and by whom.

Clear ground rules are in effect for Team TOW ITAS. The contractor is totally responsible for the design and for meeting the requirements of the contract. The Government's role is to advise, make suggestions and help where they can. The contractor may take whatever advice he wishes but he is totally responsible for meeting contract requirements.

TI has a well established IPDP. The company has used the process on several projects and has developed a comprehensive training program. All TI members of the FEE team received the IPDP training. Five Government members of the FEE team also participated in TI's IPDP training. These five Government members help to facilitate the operation of the Government FEE team. As an adjunct to TI's IPDP, the contractor and Government partners jointly developed and monitored a series of tailored paths to prominent scheduled milestones (e.g., PDR, CDR, and Test). These paths define the successful entry and exit criteria.

Government members of the FEE team meet weekly at the CCAWS project office to exchange information and coordinate plans. TI has a resident representative stationed in Huntsville, AL who attends these meetings. Government members of the FEE team also participate as needed in a monthly briefing to the

PM, CCAWS. While Government personnel do not work in a common office at MICOM, reasonable proximity and good communications systems still allow the team members to work together effectively. Contractor members of the FEE team work together at the TI facility in Dallas, TX. The contractor team meets weekly at TI. At least one Government FEE representative attends these meetings. Government personnel from the FEE team travel to TI to meet with their counterparts as needed. The heaviest concentration of Government personnel at TI was between PDR and CDR. Besides face-to-face meetings, phone, fax and video conferencing communications are in extensive use. Government personnel have on-line, real time access at MICOM to TI's TOW ITAS data base, for timely review of drawings and other data.

The FEE team makes its own decisions whenever possible. This works well because team members were able to establish ownership of the process during the kick-off meeting. Issues that cannot be resolved by the FEE or recommendations that require efforts outside the scope of the contract take an upward route through the FEE to the ITAS Product Manager. If necessary, they go to the CCAWS PM for resolution.

The people that work on each of the Work Breakdown Structure (WBS) elements track the expenditures for those elements. The contractor prepares the cost performance report which show expenditures for each WBS element. One Government FEE member, who works on a given element and appointed to track expenditures for that element, tracks it. The Government reviews the report with his contractor counterpart to ensure that budget and schedule are maintained. A joint video conference cost reviews convene once per month to track overall program costs.

The approach taken on the TOW ITAS project has reduced the need for formal reviews. Formal program reviews with the contractor occur semi-annual rather than monthly. The contractor prepares fewer deliverables because the Government has ready access to information as it develops. To reduce costs further, the Government requests only one copy of each deliverable.

No problems have arisen concerning proprietary information. The emphasis is on the use of non-proprietary commercial technology. There is no proprietary process involved in the production of the ITAS.

The CE approach taken for the TOW ITAS projects has been effective in controlling cost and schedule. The timely, direct communications are increasing the effectiveness of the personnel assigned to the program.

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APPENDIX C

SUCCESSFUL MANAGEMENT PRACTICES/TECHNIQUES SUMMARIES

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SUCCESSFUL PRACTICES

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INFORMATION

IPPM SUCCESSFUL PRACTICES SURVEY
ABRAMS TANK SYSTEM PROJECT MANAGEMENT OFFICE
18 DECEMBER 1996

IPPM APPLICATION AREA: IPT Structure

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: IPT Structure

DISCUSSION: The Abram's Tank System has been using the IPT process for years as a management tool long before the new IPPM teams were established. The Abram's PM has used WIPT type groups throughout the program to resolve issues/problems between the numerous contractors, vendors, other Government agencies, and foreign countries that it deals with. The foreign countries often have different requirements than the U.S. which has created a separate set of circumstances and problems for the WIPT to resolve.

Personnel from the PM office normally chair the various WIPT which covers areas from logistics to testing to engineering to contracting. Often the WIPT members do the lions share of the work, such as preparing test plans for use by TECOM at their Aberdeen Proving Grounds in MD.

The Abrams PM established the various WIPTs as they were subsequently spelled out in the AMC Pamphlet (AMCP 70-27).

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IPPM SUCCESSFUL PRACTICES SURVEY
BATTLEFIELD COMBAT IDENTIFICATION SYSTEM (BCIS)
PROJECT MANAGEMENT OFFICE
8 JANUARY 1997

IPPM APPLICATION AREA: IPT Structure

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: IPT Structure

DISCUSSION: In order to manage the EMD effort for the BCIS, the PM Combat Identification (PM CID) formed Team BCIS. Team BCIS is comprised of representatives from PM CID, CECOM, DPRO, TRW (the prime contractor), and Hughes Defense Communications (the only major subcontractor empowered to make those decisions necessary to run the program throughout its life cycle).

Team BCIS consists of three parts: The WIPTs, a Management Working Group (MWG), and an Executive Review Committee (ERC). WIPTs meet as necessary to discuss pertinent issues and problems, and to develop and implement solutions. WIPT results are passed along to the MWG for review, comment and guidance. The ERC provides senior level oversight and direction to the MWG. Issues that need high level decisions and actions are raised to the ERC.

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IPPM SUCCESSFUL PRACTICES SURVEY
BATTLEFIELD COMBAT IDENTIFICATION SYSTEM (BCIS)
PROJECT MANAGEMENT OFFICE
8 JANUARY 1997

IPPM APPLICATION AREA: IPT Structure

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Partnering Agreement

DISCUSSION: BCIS IPT operates according to a written "partnering" agreement that promotes the achievement of mutually beneficial goals. This team of Government and contractor personnel are dedicated and committed to positive utilization of partnering in the performance and administration of the program. The team works to build action plans, eliminate communication barriers, resolve conflicts at the lowest possible level, streamline processes, and maintain a team spirit to achieve maximum success for all. Partnering guidelines establishes:

- Commitment to open communications, joint problem solving and teamwork to accomplish the goals and objectives of the BCIS contract

- Sharing of information at all levels with all team members and places importance on timely, positive, and ongoing communications

- Swift respond to concerns, deadlines, and requests

- Accomplishment of all milestones on or ahead of schedule

- Mutual trust, responsiveness, flexibility, and open communications.

The BCIS IPT has followed these partnering guidelines since the basic contract award in 1993. It has enabled all parties to satisfactorily meet all contract requirements and resolve all Government/contractor conflicts without the need for arbitration or litigation.

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IPPM SUCCESSFUL PRACTICES SURVEY
UH-60 BLACKHAWK PROJECT MANAGEMENT OFFICE
20 NOVEMBER 1996

IPPM APPLICATION AREA: IPT Structure

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: IPT Structure

DISCUSSION: The Blackhawk IPTs are formed on an ad-hoc basis depending upon the nature of the program element or activity. IPT purpose determines the size and membership (part time versus full time) requirements. The ground rules for IPT operations are established early and include:

- empowerment of IPT members
- establishment of an operating charter
- management oversight by an Executive Steering Group
- conduct of formal meetings with established agendas
- open communication among all team members utilizing all means of available communication
- joint Government/contractor IPT interface meetings and coordination communications
- consistent participation by same members (if feasible).

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IPPM SUCCESSFUL PRACTICES SURVEY
CLOSE COMBAT TACTICAL TRAINER (CCTT)
PROJECT MANAGEMENT OFFICE
23 JANUARY 1997

IPPM APPLICATION AREA: IPT Structure

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: IPT Structure/Co-location

DISCUSSION: The CCTT IPTs have been structured to include the user community to the greatest extent possible. Two representatives of TRADOC were stationed at the Integrated Development Facility to participate as full members of the IPTs. They were given access to all information shared among the teams and were expected to share their perspective on all issues discussed. Users also participated in the PDRs and CDRs. As a result, design details could be communicated to TRADOC representatives who had not had the benefit of extended participation on the IPTs. Additionally, users participated in a spiral software development effort. The spiral approach to software development calls for incremental development of an increasingly complex software functionality until the full requirement is met. As each level of increasing functionality became available for testing, teams of experienced soldiers were invited to run exercises on the newly integrated software and provide the contractor with direct feedback on the success of the simulation effort.

This level of user involvement has been both a benefit and a challenge for the program. The challenge has occurred in the form of a tendency toward requirements growth that has occurred as the users have become more aware of the design possibilities. The program office believes, however, that the benefits of increased understanding of the requirements early in the program and increased user acceptance of the design that has resulted from their early and continued participation has more than compensated for the challenges.

Both COL Shiflett and Mr. Edwards recommended that, on large complex software integration efforts such as the CCTT program, co-location of development team members was critical for program success. The daily face to face interaction that allowed nearly real-time solutions to design problems proved to be invaluable for the successful completion of the program. This co-location of team members relies on the inter-personal skills of all team members and enhances the benefits that can be achieved through the chance opportunities that are created when team members interact on a frequent, often daily, basis. They both warned, however, that the increased interaction caused by this co-location also increased costs in terms of personnel resource requirements. For this reason both questioned the utility of co-location of team members on programs where either the interfaces between program segments is well defined or the size of the program does not warrant the expense.

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IPPM SUCCESSFUL PRACTICES SURVEY
RAH-66 COMANCHE PROJECT MANAGEMENT OFFICE
13 DECEMBER 1996

IPPM APPLICATION AREA: IPT Structure

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: IPT Structure

DISCUSSION: The Comanche Program Team is structured along the lines of product-focused, multi-disciplinary IPTs/PDTs. There are four major tiers in the organizational structure.

- Tier 0 consists of an executive leadership team co-chaired by the PMO and the prime contractor (Boeing) Program Director. Tier 0 schedules are developed and maintained by the Army PMO.

- Tier 1 consists of the Boeing/Sikorsky Air Vehicle Integration Team. Tier I schedules contain major program and contract milestones, major events, and prerequisites to accomplish the program.

- Tier II teams are composed of analysis and integration teams assigned to perform program level tasks involving more than one IPT/PDT. Tier II schedules support the Tier I plan with additional details, and bridges the gap between the Tier II IMP elements and Tier III IPD/PDT schedules.

- Tier III personnel include approximately 35 IPTs/PDTs from the appropriate functional disciplines tasked to provide specific products on an assigned schedule, within an allocated budget and compliant to specified requirements.

Each IPT manages its own product objectives, requirements, deliverables, schedules, major events, completion criteria, interfaces, processes, standards, and performance metrics. Government participants are included within each tier.

The IPT structure provided for:

- excellent communications channels between the U. S. Army and Boeing/Sikorsky
- integrated, focused effort on the system to be developed
- equal emphasis on producibility, supportability and quality as is placed on cost, weight, and performance.

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IPPM SUCCESSFUL PRACTICES SURVEY
RAH-66 COMANCHE PROJECT MANAGEMENT OFFICE
13 DECEMBER 1996

IPPM APPLICATION AREA: IPT Structure

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: IPT Charter

DISCUSSION: The Comanche PMO is in the process of developing and publishing product-oriented charters for use by all assigned IPTs and Analysis and Integration Teams (AITs). The charters define AIT and IPT responsibilities and rules to support the PMO Integrated Master Plan/Integrated Master Schedule (IMP/IMS) and manage risk during the latter portion of the Phase I Program Definition and Risk Reduction (PDRR) acquisition life cycle phase. An outline of typical charter topics follows:

- Overview
- Purpose
- Authority
- Membership
- Subordinate Technical Areas
- Ground Rules
  - Open Discussions with No Secrets
  - Qualified, Empowered Team Members
  - Continuous "Up-The-Line" Communications
  - Reasoned Disagreement (How to manage and conduct)
- Meeting Guidelines
  - Focus (To support Milestones/reach agreements on strategies/resolve issues and problems)
  - Orientation of Team Members (Developing a common understanding of the program)
  - Rules for Agenda Development and Timely Submission
  - Frequency of Meetings (Rules for timely advance notice)
  - Meeting Summaries (Timeliness and Distribution Rules)
- Responsibilities
  - Definition of Responsibilities (schedule maintenance, cost and schedule metrics, performance metrics, and expected results)
- Functions
  - Scope of Authority
  - Measurable Success Criteria
  - Risk Management Processes
  - Performance Metrics
- Products
  - Definition of Expected Products
- Customer-Supplier Relationships
  - Explanation of Interfacing Relationships and Scheduling (with other IPT products to support the objectives of the Comanche weapon system)

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IPPM SUCCESSFUL PRACTICES SURVEY
COMMAND AND CONTROL VEHICLE (C2V) PROJECT MANAGEMENT OFFICE
20 NOVEMBER 1996

IPPM APPLICATION AREA: **IPT Structure**

SUCCESSFUL PRACTICE: X **INFORMATION**: **PROBLEM**:

DESCRIPTION: IPT Structure

DISCUSSION: The C2V program was required to go to an ASARC for an LRIP decision and they formed an IPT to take them through the decision point. Members were assigned from the required offices and generally stayed until the major decision was made. This IPT was established approximately twelve months prior to the decision meeting and started out on a monthly basis, but increased its frequency as the date approached the "red zone".

The meetings were informal as they progressed up the ladder until they were chaired by a general officer. Minutes were kept of all meetings. Action items were always identified and maintained as action items until a solution was identified and the item was incorporated into the permanent minutes.

One problem resolved by the IPT that facilitated another program, the Bradley Fire Support Team Vehicle (BFIST) during a milestone review, was the documentation format and presentation required by the ASARC that had not been documented in the SARDA "Guide for the Preparation of Army Acquisition Programs for Review by the ASARC".

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IPPM SUCCESSFUL PRACTICES SURVEY
COMMAND AND CONTROL VEHICLE (C2V) PROJECT MANAGEMENT OFFICE
20 NOVEMBER 1996

IPPM APPLICATION AREA: **IPT Structure**

SUCCESSFUL PRACTICE: X **INFORMATION**: **PROBLEM**:

DESCRIPTION: Contractor IPT

DISCUSSION: The C2V contractor, United Defense Limited Partnership (UDLP), was formed by the merger of two contractors, BMY in Pennsylvania and FMC in California. To facilitate contract management and decision making, the contractors established their own IPT with membership from both locations. Each contractor had technical representatives from all pertinent offices. These offices involved all aspects of the contract, not just engineering.

This special IPT, consisted of only contractor personnel and continued for over a year. Outside representatives from their subcontractors were asked to attend these meetings whenever their particular work was involved. Government personnel were invited as required or when progress reports were being made to them.

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IPPM SUCCESSFUL PRACTICES SURVEY
CRUSADER PROGRAM MANAGEMENT OFFICE
3 DECEMBER 1996

IPPM APPLICATION AREA: IPT Structure

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: IPT Structure

DISCUSSION: The user of the Crusader end product, TRADOC, is intimately involved in the IPPM process and has representatives co-located with the contractor at his plant. The user is involved in the requirements trade studies, requirements analysis, and concept development.

The Government participants are proactive and participate and do not wait for IPRs to reorient and adjust the course of action. The IPPM/IPT resolves issues and conflicts within the structure of UDLP's organization at the lowest level.

TRADOC System Manager (TSM), Cannon is an integral part of the Management Team and is represented in any potential performance trade-off studies. He ensures the adherence of the Crusader system and the approved operational requirements document. Co-location at the UDLP plant facilitates this involved participation.

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IPPM SUCCESSFUL PRACTICES SURVEY
CRUSADER PROGRAM MANAGEMENT OFFICE
3 DECEMBER 1996

IPPM APPLICATION AREA: **IPT Structure**

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: IPT Charter

DISCUSSION: PMO Crusader proposed the implementation of a Senior Level Integrated Process Team Coordinating Council (SLICC) in support of Program Decision Milestone I. The SLICC was composed of OPM, DA and OSD staffs. The SLICC's charter was to provide continuous oversight, improve communication between DA/OSD staffs, assist in problem resolution, and assure continuous and comprehensive evaluation of the Crusader Program through maintenance of the Integrated Program Assessment.

The Crusader charter emphasized the need for structured training, the importance of communications, the establishment of clear team goals, maximum participation on the part of all, establishment of well defined rules as to arriving at decisions, development of basic ground rules, awareness of the importance of the team process and a full understanding of empowerment - what it is and what it is not.

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IPPM SUCCESSFUL PRACTICES SURVEY
ENHANCED FIBER OPTIC GUIDED MISSILE (EFOGM)
PROGRAM MANAGEMENT OFFICE
20 NOVEMBER 1996

IPPM APPLICATION AREA: **IPT Structure**

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM**:

DESCRIPTION: IPT Structure

DISCUSSION: Vendors are geographically scattered but the prime contractor, Raytheon, is in Huntsville, AL. Government and contractor employees work side by side on a daily basis so that formal reviews are virtually eliminated but when they are held, they constitute management and decision updates of the status of mutually shared progress.

The Government personnel co-located with the contractor includes the program Chief Engineer, Chief Test Engineer, and Cost Analyst.

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IPPM SUCCESSFUL PRACTICES SURVEY
AH-64D LONGBOW APACHE PROJECT MANAGEMENT OFFICE
10 DECEMBER 1996

IPPM APPLICATION AREA: IPT Structure

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Longbow Apache Commercialization IPT Structure

DISCUSSION: The Longbow Apache PMO has organized an IPT to manage the accomplishment of applying commercial practices in the remanufacture of the AH-64A to the AH-64D helicopter configuration and for follow-on interim support. Principal IPT member representation includes the PMO staff, the contractor, McDonnell Douglas Helicopter Systems (MDHS), DCAA, DCMC, and the users. The IPT is co-chaired by the PM and MDHS. The primary goal of the IPT is to redefine Government/MDHS relationships, help streamline the acquisition process, reduce cost of ownership through use of commercial practices wherever possible, and reduce Government contract oversight.

Four teams were established and assigned tasking as follows:

- Acquisition (contract type and price determination)
- Product Definition (configuration management)
- Production (production process)
- Production Support (logistics)

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IPPM SUCCESSFUL PRACTICES SURVEY
PALADIN PROGRAM MANAGEMENT OFFICE
18 DECEMBER 1996

IPPM APPLICATION AREA: **IPT Structure**

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Memorandum of Understanding (MOU)

DISCUSSION: The M-109A6 Paladin Program did not operate under a charter, per se, but established a comprehensive MOU known as the Paladin Production Enterprise. The MOU was established because of the uniqueness of the program that involves a Government to Government relationship as well as a Government to contractor relationship. While the main turret is new production, the chassis is rebuilt and provided to the contractor UDLP by Letterkenny Army Depot (LEAD).

DCMC provides general oversight of all production activities and is the accepted authority for the completed systems. Teaming established via this MOU and used throughout the process has resulted in changing LEAD's approach from a rebuild approach to an approach aimed at production.

The Paladin Production Enterprise MOU has proven to be an excellent example of the IPPM/IPT approach to a unique contracting situation.

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IPPM SUCCESSFUL PRACTICES SURVEY
PATRIOT ADVANCED CAPABILITY - 3 (PAC-3) PROGRAM MANAGEMENT OFFICE
22 NOVEMBER 1996

IPPM APPLICATION AREA: **IPT Structure**

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: IPT Structure

DISCUSSION: The PAC-3 IPT structure includes 18 lower level IPTs, six mid-level IPTs, a Systems Integration Team (SIT) and a Program Management Team. The key to the effectiveness of the IPTs is the decentralized empowerment to make decisions. The PATRIOT PM and the PAC-3 Product Manager chartered 16 Government Product Integration Leaders. These covered the SIT, the six mid-level, and Key Process Teams, and 13 component level teams.

- Three of the six mid-level IPTs are responsible for configuration item products and three are responsible for key developmental processes. Each IPT acts because the PM empowers it, is free to commit resources in keeping with its budget, and makes events and issues known when they might impact another IPT. The leaders of these IPTs participate in the SIT.

- The SIT performs a system integration role and makes technical decisions for the program. SIT can receive a technical issue from any of the IPTs and render a decision on it within one week. However, IPTs seldom appeal to the SIT for a decision.

- The Program Management Team, composed of the Government PM and the PMs of the prime and major subcontractors, has overall program responsibility.

There is ample cross representation among the IPTs. Serving on several IPTs is commonplace.

The Patriot PM chairs a PATRIOT IPT at a level above the PAC-3. This IPT, whose membership includes representatives from Lockheed, Raytheon and other prime contractors, meets quarterly and addresses all Patriot activities.

The Overarching IPT (OIPT) at the Pentagon is called the Army Selected Acquisition Review Council/Ballistic Missile Defense Acquisition Review Council Coordination Team (ASARC/BMDARC).

The IPTs communicate on a continuous basis and meet weekly for status review. Government IPT participants also meet weekly to assure a team consensus on program progress and consistency of Government guidance to contractor teams. Additionally, the Government IPT members meet weekly for two Government only roundtables - Technical and Management Roundtable.

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IPPM SUCCESSFUL PRACTICES SURVEY
SECURE MOBILE ANTI-JAM RELIABLE TACTICAL TERMINAL (SMART-T)
PROJECT MANAGEMENT OFFICE
7 JANUARY 1997

IPPM APPLICATION AREA: IPT Structure

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: IPT Structure/Team Composition

DISCUSSION: The SMART-T IPT consists of a Core Team and a Non-Core Team. The Core Team consists of nine members representing technical, test, logistics, contracts, and business (budget and program planning). Each member has extensive weapon system management and acquisition experience (i.e., all over 15 years) and are each highly regarded in their functional areas. The team is composed of people with diverse backgrounds. In a civilian positional grade structure ranging from GS-1 to GS-15, the SMART-T IPT consists of all GS-13s and 14s except for the procurement assistant who was a GS-7. The SMART-T IPT is co-located in its own separate office. Although members still remain members of their PM Milstar functional division organization, core members are dedicated full-time to the IPT.

The SMART-T Core Team is supported by a Non-Core Team consisting of over 50 members from a variety of functional areas such as legal, safety, security, etc. The source of this support comes from functional organizations external to the PM Milstar. These members provide matrix support to the Core Team (part and full time) as required. They remain in their functional groups and most are not co-located with the core members. Although most of the non-core members are located at other facilities within Fort Monmouth, some are located at other military bases within CONUS. The support of these members is negotiated and paid for through the use of support agreements established by the Core Team.

The Non-Core Team consists of a wide background of expertise and a variety of high and low level grades. Some of these members are hand-picked by the SMART-T Core Team and some are assigned by the functional manager. Although PM Milstar and the SMART-T Core Team have influence over the workload and rating of each of the non-core members, primary management and rating responsibilities for the non-core members remain in their functional organization. Recent policy changes have allowed the PM to rate those on-site matrix personnel. Much of the success of the SMART-T team was clearly due to the integrated efforts of both the Core and Non-Core Teams.

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IPPM SUCCESSFUL PRACTICES SURVEY
SENSE AND DESTROY ARMOR (SADARM) PROJECT
MANAGEMENTOFFICE
3-4 DECEMBER 1996

IPPM APPLICATION AREA: **IPT Structure**

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: IPT Structure

DISCUSSION: Teams should be established that include all of the necessary people from all of the functional elements. The SADARM office indicated that a small team is usually better than a larger team.

Representatives from DCAA and DCMC participate on the SADARM IPT. DCAA and DCMC early involvement as part of the IPT has resulted in quicker turn around time for audits and provides face-to-face feedback to the contractor on audits and contract management matters.

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IPPM SUCCESSFUL PRACTICES SURVEY
SENSE AND DESTROY ARMOR (SADARM) PROJECT
MANAGEMENT OFFICE
3-4 DECEMBER 1996

IPPM APPLICATION AREA: **IPT Structure**

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: IPT Charter

DISCUSSION: The single most important document in the entire IPPM/IPT process is the charter. The charter is the document that defines the purpose, application, mission, a definition of the roles, and the concept of operation.

The charter should be:

- A manageable document. It must contain the key elements but it should avoid endless lists of individuals who are always subject to change.

- Define the relationships and include all of the players, Government and contractor, as well as other Government agencies.

- Define empowerment to the understanding of all.

- Define what actions are required when a dispute cannot be settled at the functional team level and outline those necessary procedures to follow that allow the unresolved issue to be elevated for resolution.

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IPPM SUCCESSFUL PRACTICES SURVEY
TUBE LAUNCHED OPTICALLY TRACKED WIRE GUIDED (TOW) MISSILE
IMPROVED TARGET ACQUISITION SYSTEM (ITAS)
PROGRAM MANAGEMENT OFFICE
21 NOVEMBER 1996

IPPM APPLICATION AREA: **IPT Structure**

SUCCESSFUL PRACTICE: X **INFORMATION**: **PROBLEM**:

DESCRIPTION: IPT Structure

DISCUSSION: The PEO, Tactical Missiles organized and chartered a joint industry-government team, called Team TOW ITAS, per the TOW ITAS RFP. The RFP requested that the contractor organize a CE team to execute the EMD contract. The Team was to define, plan, control and direct critical processes in EMD and production. They enrolled all functional disciplines, test and evaluation agencies, and the user in Team TOW ITAS in all management decisions.

The Team could not alter independent evaluator's missions in any way nor could they usurp the Test and Integration Working Group's (TIWG) prerogatives. Three elements compose the Team: the Executive Steering Group (ESG); the Management Working Group (MWG); and the Functional Execution Element (FEE).

- The ESG provides senior level oversight and overall policy direction. The PEO, Tactical Missiles is the chair. Members include: representatives from the Offices of the Deputy Undersecretary of the Army for Operations Research; Commander, U.S. Army Missile Command (MICOM); Commandant, U.S. Army Infantry School (USAIS); senior level management representatives from the U.S. Army Materiel Systems Analysis Activity (AMSAA), Operational Test and Evaluation Command (OPTEC), Test and Evaluation Command (TECOM), Night Vision and Electronic Sensors Directorate (NVESD); and the contractor vice president. The ESG meets annually or more often as required.

- The MWG provides programmatic guidance and direction. The PM, CAWS is the chair. Members include a director level contractor representative and, generally director level representatives from MICOM, USAIS, AMSAA, TECOM, NVESD, and other organizations that have direct involvement or oversight responsibility for the program. The MWG meets semi-annually or more often as required.

- The FEE manages daily program activity focusing on performance, schedule, cost, and supportability. The FEE is responsible for early problem identification and course of action recommendations. The FEE addresses the ESG/MWG via the TOW ITAS Product Manager. Its normal forum is the daily workplace and the management interchange meetings. The FEE has Government representatives from all the functional areas and a contractor representative. Also included are representatives from the Defense Plant Representative Office (DPRO), USAIS, AMSAA, TECOM, and other organizations. A FEE core group meets every week so FEE members will keep abreast of activities through the MWG and the TOW ITAS Product Manager channels (e.g., e-mail). The Product Manager sponsors weekly meetings of key FEE personnel at Redstone Arsenal.

The FEE team met initially for a one-time kick-off meeting following contract award. The meeting held at the contractor's facility lasted one week. The TOW ITAS PM started the meeting by laying the ground

rules for the project and instructing the team on what to accomplish. The contractor presented a briefing to overview the contract and their top level plans for executing it. After the contract briefing, the Government and contractor FEE members met in groups that were organized along functional lines. As instructed, the team members got to know each other and, line by line, perused those parts of the contract relating to their areas of responsibility. They had to understand the contract and agree about what was to be done and by whom.

Clear ground rules are in effect for Team TOW ITAS. The contractor is totally responsible for the design and for meeting the requirements of the contract. The Government's role is to advise, facilitate, make suggestions and help where they can. The contractor may take whatever advice he wishes but he is totally responsible for meeting contract requirements.

Government members of the FEE team meet weekly at the CCAWS project office to exchange information and coordinate plans. TI has a resident representative stationed in Huntsville, AL who attends these meetings. Government members of the FEE team also participate as needed in a monthly briefing to the PM, CCAWS. While Government personnel do not work in a common office at MICOM, reasonable proximity and good communication systems still allow the team members to work together. The contractor team meets weekly at the TI facility at McKinney, TX. Usually, at least one Government FEE representative attends these meetings. Government personnel from the FEE team travel to TI to meet with their counterparts as needed. The heaviest concentration of Government personnel at TI was between PDR and CDR. Besides face-to-face meetings, phone, fax and video conferencing communications are in extensive use. Government personnel have on-line, real time access at MICOM to TI's TOW ITAS data base for timely review of drawings and other data.

The FEE team makes its own decisions whenever possible. This works well because team members are able to establish ownership of the process during the kick-off meeting. Issues that cannot be resolved by the FEE or recommendations that require efforts outside the scope of the contract take an upward route through the FEE to the ITAS PM. If necessary, they go to the PM, CCAWS for resolution.

The FEE has strengthened the allegiance of members from the MICOM functional organizations. There seems to be a lessening of the tendency to abandon ship.

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IPPM SUCCESSFUL PRACTICES SURVEY
WIDE AREA MUNITIONS (WAM) PROJECT
MANAGEMENT OFFICE
2 DECEMBER 1996

IPPM APPLICATION AREA: **IPT Structure**

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM**:

DESCRIPTION: IPT Structure

DISCUSSION: The WAM management team realized the importance of communication between all Government and contractor personnel involved in the program. The IPPM concept was seen as an excellent tool to empower workers, develop good working relationships, and foster a sense of ownership. All team members played equally important roles in the development of the contracts and their requirements.

The WAM Acquisition Team consisted of three sub-teams: (1) An Executive Team, (2) An Integration Team and (3) Working Level Teams to accomplish acquisition streamlining objectives.

- The Working Level Teams consisted of two Integrated Teams (i.e., WAM Product Improvement Program and WAM Low Rate Production). The Working Level Teams handled the day-to-day activities and resolved the issues of drafting the contracts.

- The Integration Team supported both IPTs by assisting in the resolution of issues and providing resources.

- The Executive Team supported the sub-teams by providing leadership and commitment to mission objectives. Issues were effectively resolved within the realm of the IPT and were rarely elevated.

The Executive Team, made up of PM-MCD and Textron leadership, effectively empowered the teams, and promoted the IPPM philosophy and has achieved acquisition streamlining goals. Co-located, shared electronic data and a free flow of information were all results of WAM implementation of IPPM. PM Mines, Countermines and Demolitions (MCD) cites interaction, cooperation, and the teaming relationship as the fundamental aspects of this program's success.

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IPPM SUCCESSFUL PRACTICES SURVEY
WIDE AREA MUNITIONS (WAM) PROJECT
MANAGEMENT OFFICE
2 DECEMBER 1996

IPPM APPLICATION AREA: **IPT Structure**

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Charter

DISCUSSION: The PM MCD and the Textron Systems Division's Vice President of Integrated Product Development signed a charter to establish an Acquisition Streamlining Process between the two parties thereby initiating the IPPM Team concept. The charter established an IPT for development of the noncompetitive WAM LRIP contract. The LRIP IPT, which consisted of both contractor and Government personnel, was tasked to collectively develop an agreeable solicitation and proposal, award a contract under a very aggressive schedule, and dynamically change user requirements.

The WAM Acquisition Team consisted of three sub-teams: (1) An Executive Team, (2) An Integration Team and (3) Working Level Teams to accomplish acquisition streamlining objectives. The Working Level Teams consisted of two Integrated Product Teams (i.e., WAM Product Improvement and WAM Low Rate Production).

The charter not only established the organization of the WAM Acquisition Team, it established the commitment and support of upper Government and contractor management. It also described the mission/goal of the team, identified leaders and other key functional elements and formalized the entire WAM acquisition streamlining process. The charter, which was purposely kept brief, was carefully worded to establish the IPT objectives and not to designate a particular method of accomplishing the tasks.

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IPPM SUCCESSFUL PRACTICES SURVEY
ABRAMS TANK SYSTEM PROJECT MANAGEMENT OFFICE
18 DECEMBER 1996

IPPM APPLICATION AREA: **Training**

SUCCESSFUL PRACTICE: X **INFORMATION**: **PROBLEM**:

DESCRIPTION: Training by the Cascading Method

DISCUSSION: The Abram's IPT attempted to train its members via a cascading of the information from the top down to the lower positions, i.e., the higher positions received the training and then passed it on to their respective team members. This process has been fraught with problems. Getting the first level to receive the training is a major problem because of scheduling problems. Once they are trained, they must then prepare to train the personnel under their supervision.

A major problem is that the designated trainer may not be very good at training others. Additionally, the quality of training deteriorates as it goes down the chain because each level loses some content from the previous level. Quality will also deteriorate as each level may be delayed in giving the training because of time lost.

Scheduling also comes into play. It is difficult to get all of the people together at the same time because of work load, travel, leave, etc. A second or third session may then be necessary. All of this takes an inordinate amount of time out of their already busy schedule and greatly takes away from their respective jobs.

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The Abram's PM indicated that the cascading training method is non-productive and that professional training is necessary.

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IPPM SUCCESSFUL PRACTICES SURVEY
BRADLEY FIGHTING VEHICLE SYSTEM PROJECT
MANAGEMENT OFFICE
19 DECEMBER 1996

IPPM APPLICATION AREA: **Training**

SUCCESSFUL PRACTICE: X **INFORMATION**: **PROBLEM**:

DESCRIPTION: Contractor Training

DISCUSSION: The PM directed and participated in joint training with their contractor. The Bradley contractor, United Defense Limited Partnership (UDLP), purchased TI's Integrated Product Development Process (IPDP) package and has incorporated it into its corporate-wide policy. The PDT has its roots in the document, "The Role Of Concurrent Engineering In Weapons Systems Acquisition". UDLP believes so strongly in the systems that they grade their managers on their use of the PDT concept. TI trained three levels of management in UDLP. The Bradley PMO personnel were concurrently trained with the third level.

This joint training was practical and had the effect of all personnel involved with the program being trained at the same time by the same people so that there can be no discrepancy at a later date. It is also the fastest and least costly way to train personnel.

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IPPM SUCCESSFUL PRACTICES SURVEY
CLOSE COMBAT TACTICAL TRAINER (CCTT)
PROJECT MANAGEMENT OFFICE
23 JANUARY 1997

IPPM APPLICATION AREA: Training

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Team Training

DISCUSSION: COL Shiflett felt strongly that team training was an absolute necessity to the successful implementation of IPTs. "The path of self discovery does not work," he stated. He recommended that future programs follow the same approach that had been used in the CCTT program.

During the early months of the CCTT development program, consultants were used to help establish the IPTs. Three off-site training sessions were held for all team personnel. At these sessions, training in interpersonal skills and team participation was presented and team missions and charters were established. The principles presented included empowered multi-disciplined teams, a high level of user involvement, and life cycle product ownership. A hierarchy of processes was presented detailing the operation of all levels of the organization from the program office, down through the integrated development teams, sub-teams, and working groups. These processes covered such behaviors as processing contract baseline change requests, generation and delivery of contract data, and day to day execution of the team activities.

This early training provided team members a common set of expectations and a shared understanding of the basic ground rules. This common background allowed them to progress more rapidly through the early stages of team formation.

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IPPM SUCCESSFUL PRACTICES SURVEY
PATRIOT ADVANCED CAPABILITY - 3 (PAC-3) PROGRAM MANAGEMENT OFFICE
22 NOVEMBER 1996

IPPM APPLICATION AREA: **Training**

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Contractor Training

DISCUSSION: At the direction of the IPT Executive Steering Committee, chaired by the Director of the MICOM Research, Development, and Engineering Center, the University of Alabama, Huntsville, AL prepared a three-day training program. The training was prepared for the entire Redstone community. The University trainers also tailored the course for presentation to single organizations, such as the PM for Unmanned Air Vehicles.

PAC-3 IPT members receive additional training in three "diagnostic control systems" (DCS) described by Robert Simons in his article in Harvard Business Review (March-April 1995):

- Earned Value Management (EVM)
- Technical Performance Measurement (TPM)
- Critical Path Analysis (CPA)

They receive 30 hours of training in EVM and the contractor's performance measurement systems.

These management tools allow the IPTs to identify cost accounts and activities that deviate from the technical or performance measurement baselines. The lower level IPTs, through examination of detailed management data (manloading reports, material requests, technical issues, etc.), can quantitatively measure deviations and "replan" how they will recover from the baseline deviation.

The higher level IPTs, such as the SIT and the PMT manage by exception, yet maintain awareness of program progress. The PAC-3 IPTs, for example, must explain root causes and integrated solutions for cost accounts with greater than three percent cost or schedule variances and for critical path activities that are more than five days behind schedule.

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IPPM SUCCESSFUL PRACTICES SURVEY
SECURE MOBILE ANTI-JAM RELIABLE TACTICAL TERMINAL (SMART-T)
PROJECT MANAGEMENT OFFICE
7 JANUARY 1997

IPPM APPLICATION AREA: Training

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Training

DISCUSSION: The IPT was never given any formal training on how to develop team relationships and processes. The IPT followed the stages of development supporting Tuckman's theory. The "storming" stage was probably extended due to the fact that many of these interaction and communication processes had to be worked out. The team entered the "performing" stage within six months of initiation. Team training may have provided the team the ability to have shortened the "storming" and "norming" stages by providing the team some of the techniques that it had to develop on its own for managing conflicts, decision making, etc. One factor that had contributed to the group resolving relationship and process differences was the fact that most of the team had worked with each other on prior assignments.

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IPPM SUCCESSFUL PRACTICES SURVEY
SINGLE CHANNEL ANTI-JAM MANPORTABLE (SCAMP)
PROJECT MANAGEMENT OFFICE
9 JANUARY 1997

IPPM APPLICATION AREA: Training

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Training

DISCUSSION: Initial IPT training for SCAMP IPT consisted of a three day Government sponsored training session that included lectures and some practical exercises.

Additional training was provided by the prime contractor, Rockwell International, Richardson, TX. They took the initiative, with the support of the PMO, to set up a two day formal training program that included key SCAMP IPT members and their Rockwell Corporation counterparts. The joint training focused on the current SCAMP program working environment, involved "real life" IPT goals and objectives and was accomplished in conjunction with the contract "partnering" agreement between the PM Milstar and Rockwell Corporation. The training was well received by IPT members and contributed significantly to the ability of the combined team to build action plans, breakdown communication barriers and resolve conflicts at the IPT level. IPT members concluded that the joint training sessions and exercises fully met their expectations and need to improve IPT processes and team performance.

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IPPM SUCCESSFUL PRACTICES SURVEY
ABRAMS TANK SYSTEM PROJECT MANAGEMENT OFFICE
18 DECEMBER 1996

IPPM APPLICATION AREA: Meeting Techniques

SUCCESSFUL PRACTICE: X **INFORMATION**: **PROBLEM**:

DESCRIPTION: Presentation Techniques

DISCUSSION: One of the sub-IPTs within the Abrams organization uses unique presentation techniques throughout their IPT process. Presenters are instructed to use three basic colors in preparing their viewgraphs, red, yellow and green.

- Red shows that the action either is in trouble from a cost stand point or behind in schedule;

- Yellow shows that the item is marginal and could go either way without some positive action(s) taken;

- Green means that the action/issue is on or ahead of cost and/or schedule. By using this color coding, there is uniformity in the charts. Those receiving the presentations can quickly grasp the status of the action.

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IPPM SUCCESSFUL PRACTICES SURVEY
ABRAMS TANK SYSTEM PROJECT MANAGEMENT OFFICE
18 DECEMBER 1996

IPPM APPLICATION AREA: Meeting Techniques

SUCCESSFUL PRACTICE: X **INFORMATION**: **PROBLEM**:

DESCRIPTION: Meetings

DISCUSSION: The Abrams IPTs adhere to the meeting agendas and limit the number of attendees whether it is the main IPT or a sub-IPT. If the sub-IPT is to present a resolution to the main IPT, for example, the sub-IPTs are limited to the number of people who can be present during the briefing and the amount of time that they have on the agenda. The agenda is adjusted to accommodate the sub-IPT member's schedule so that the presentation can be presented at a specific time to allow for the release of these members. This approach keeps the agenda on track, keeps those that are not involved in the IPT from sitting through unnecessary presentations, and quickly resolves the issues. This also keeps the discussion pertinent and does not require extra presentations and/or discussions to bring the members of the sub-IPT up to speed.

The regular member then stays while the others are free to return to their work site. This keeps everything on schedule and keeps everyone actively engaged.

The Abrams PM also tries to have one "Star Burst" or "Atta-Boy" along the way. Since IPT meetings are normally called together to address problems, personnel do not always get to hear too many favorable comments. These "Atta-Boys" show some positive accomplishments for the program and perhaps ones that have involved that particular IPT. They help to keep the interest up for the program and keep the morale at a high plane.

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IPPM SUCCESSFUL PRACTICES SURVEY
BATTLEFIELD COMBAT IDENTIFICATION SYSTEM (BCIS)
PROJECT MANAGEMENT OFFICE
8 JANUARY 1997

IPPM APPLICATION AREA: Meeting Techniques

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Meetings

DISCUSSION: The BCIS IPTs use the following meeting techniques which have proven highly successful:

- establish IPT plan of action and milestone
- prepare formal agenda for team meetings
- ensure all interested team members are invited to all team meetings
- conduct short and informal meetings
- utilize "brainstorming" techniques and practices for problem resolution
- resolve conflicts through means of group consensus of opinions
- refer to the executive (PM) level for a decision when unable to reach a consensus.

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IPPM SUCCESSFUL PRACTICES SURVEY
BRADLEY FIGHTING VEHICLE SYSTEM PROJECT
MANAGERMENT OFFICE
19 DECEMBER 1996

IPPM APPLICATION AREA: **Meeting Techniques**

SUCCESSFUL PRACTICE :X **INFORMATION**: **PROBLEM**:

DESCRIPTION: Meetings

DISCUSSION: IPT members are encouraged to participate in open discussion, be willing to speak up and articulate their position, be prepared to come to some solution in a timely manner if they disagree with the members, and keep their immediate supervisors informed of the progress. The members must keep the PM/IPT informed of position(s) that may not be the same as that which was agreed upon at the meeting.

Minutes are kept for all meetings and transmitted via e-mail to the pertinent levels for information. A separate file of the meeting minutes is also maintained for ready reference.

Actions that need to be resolved are discussed. Each action item stays on the agenda until it is resolved and then the solution is entered into the permanent minutes of the meeting. Action items are continually reviewed until they have been resolved/completed.

At the close of the meeting, the action items are outlined and restated by the chairman to ensure that they are correct and there is an assigned person who has the responsibility for that action. Action items are included as part of the minutes.

The members are furnished a "read ahead" prior to the meeting. This action varies from meeting to meeting depending upon the actions and/or agenda items to be discussed.

The Bradley IPT uses a couple of different techniques to keep the meetings on time and current. They elect a Sergeant of Arms for the meeting who is responsible to start the meeting on time and keep the meeting agenda on schedule. It is also his/her responsibility to keep the conversation pertinent to subjects that are being discussed.

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IPPM SUCCESSFUL PRACTICES SURVEY
CLOSE COMBAT TACTICAL TRAINER (CCTT)
PROJECT MANAGEMENT OFFICE
23 JANUARY 1997

IPPM APPLICATION AREA: Meeting Techniques

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Communication

DISCUSSION: The CCTT IPT uses an array of basic networking tools to communicate the volumes of information required to successfully conduct teaming efforts. These include e-mail, CITIS, and electronic access to shared working data contained in draft documents and shared databases.

Early difficulties in using these electronic tools highlighted several basic conditions that need to be addressed for their successful use. These conditions include:

- The need to establish functional networks with sufficient bandwidth to allow the nearly instantaneous transfer of information throughout the IPT. Network improvements from leased lines through the present fiber optic connections were necessary to allow shared access to program data to become a truly useful collaboration tool.

- The use of a well defined set of software applications or tools throughout the team. Even though the prime contract required delivery of data to the CITIS in several standard formats, islands of shared information developed that were created and accessed through different tools. Until all involved team members obtained the required tools, the ability to use the information that was available was thwarted.

- The full participation of all members in the electronic networking effort. One of the difficulties experienced on the CCTT program has been the inability of team members to overcome company policies on sharing of information across company and customer boundaries. Even the best of collaboration tools will fail if they are not used.

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IPPM SUCCESSFUL PRACTICES SURVEY
RAH-66 COMANCHE PROJECT MANAGEMENT OFFICE
13 DECEMBER 1996

IPPM APPLICATION AREA: Meeting Techniques

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Communication

DISCUSSION: The Comanche program requires an organized communication process between the Government, the prime (Boeing) contractor Joint Program Office (JPO), the two separately located supporting project offices (Sikorsky (SPO) and Boeing (BPO)), and other major supporting subcontractors:

- Daily 12:45 PM teleconferences between the SPO, BPO, and JPO.

- Weekly Program Management Team (PMT) Video-Teleconferences between the SPO, BPO, JPO, and Comanche PMO.

- Periodic Program Integration Reviews (PIRs) to include JPO, BPO, SPO and Army representatives.

- Technical Interface Meetings (TIMs) with major subcontractors, suppliers and the Product Development Teams (PDTs), IPTs, AIT, and Government representatives.

- Periodic Progress Reviews, Executive (EPRs), and Program (PPRs), with the BPO, SPO, JPO, and Government representatives.

- Periodic contractor Program Manager Meetings (PMMs)

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IPPM SUCCESSFUL PRACTICES SURVEY
CRUSADER PROGRAM MANAGEMENT OFFICE
3 DECEMBER 1996

IPPM APPLICATION AREA: **Meeting Techniques**

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Communication

DISCUSSION: PM Crusader recognized from the onset that contractor/Government communication was absolutely necessary and that periodic IPRs and scheduled meetings were incapable of providing the insight needed to successfully operate in an IPPM/IPD environment.

Open communication was established horizontally and vertically and effective communication, coordination and integration forums were established to enhance and facilitate communication. The out-of-sight, out-of-mind mentality was discouraged and frequent face-to-face communication was encouraged.

Communication between the PMO, the contractors, United Defense Limited Partnership and its major subs, and the TRADOC System Manager (TSM) is enhanced by mutual access to a real-time information system, the Contractor Integrated Technical Information Service (CITIS).

The CITIS system links the geographically dispersed contractors and Government players electronically in a common working environment. The objective of this program is to achieve "virtual collocation" of the team through near real-time availability of data, common development tools and integrated product data management across all sites. This system allows all of the Crusader Team members at each of the dispersed sites to have the ability to share data, documents and drawings with counterparts, both Government and contractor, at all sites from initial drafts through the final product. CITIS will be 100 percent complete in March 1997 and has approximately 100 people accessing at any given time. The PM Office expects to purchase approximately 750 individual licenses for individuals to use in the program.

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IPPM SUCCESSFUL PRACTICES SURVEY
ENHANCED POSITION LOCATION REPORTING SYSTEM (EPLRS)
PROJECT MANAGEMENT OFFICE
8 JANUARY 1997

IPPM APPLICATION AREA: Meeting Techniques

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Meeting Management

DISCUSSION: The EPLRS PMO methodology for implementing and using IPTs includes the following practices and techniques:

- PM holds the IPT "kick off " meeting, establishes the goals/objective(s) of the team and ensures that IPT roles, responsibilities and ground rules concerning IPT conduct and operations are in place. PM must continue to retain a high level of interest in IPT operations and maintain the leadership momentum to ensure a successful IPT.

- Challenge the team with aggressive schedules, the need to be innovative and creative in their thinking on problems and issues, question the status quo, and view their actions from a "what is the value added" point of view.

- Establish an IPT environment that fosters team cooperation by selection of members who can work well with others, are well respected by their peers and who are unafraid to challenge boundaries and assume a degree of risk.

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IPPM SUCCESSFUL PRACTICES SURVEY
ENHANCED FIBER OPTIC GUIDED MISSILE (EFOGM)
PROGRAM MANAGEMENT OFFICE
20 NOVEMBER 1996

IPPM APPLICATION AREA: Meeting Techniques

SUCCESSFUL PRACTICE: X **INFORMATION**: **PROBLEM**:

DESCRIPTION: Communication

DISCUSSION: The EFOGM IPT has capitalized on the capabilities of modern electronic data transfer. All contract data items are delivered electronically (except for classified items). This process permits the involved action officers to immediately begin their respective actions while, in parallel, speeding the process of logging in data deliveries (now done automatically without human intervention).

E-Mail, voice mail, video teleconferencing and use of an integrated electronic CaLANdar software program have sped meeting and message coordination efforts.

- PM personnel use CaLANdar (trademark) for scheduling meetings with each other and their counterparts at Raytheon and at selected vendors. About 250 users have access to this software system.

- Agent 32 (trademark) is a collaborative electronic bulletin board used by the IPT subteams. Subteam members can post documents, comments, etc., in their own section of the bulletin board.

- Netscape Navigator (trademark) is an Internet browser the IPT members can use to reach a password protected web page.
  - The web page contains a replica of the Contractor Integrated Technical Information Service (CITIS).
  - The firewall can be troublesome because a swipe card generates a password on the fly.
  - If a user does not enter the correct response in 60 seconds, the firewall excludes access.

- The PM has been using Video Teleconferencing (VTC) for a long time and has begun limited use of Desktop Video Teleconferencing.

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IPPM SUCCESSFUL PRACTICES SURVEY
AH-64D LONGBOW APACHE PROJECT MANAGEMENT OFFICE
10 DECEMBER 1996

IPPM APPLICATION AREA: Meeting Techniques

SUCCESSFUL PRACTICE: X **INFORMATION** **PROBLEM:**

DESCRIPTION: Communication

DISCUSSION: In August 1996, the Longbow PMO signed a five-year, $1.9 billion contract with McDonnell Douglas Helicopter Systems (MDHS) to remanufacture 232 of the planned 758 aircraft to the AH-64D configuration.

Utilizing general CITIS/CALS procedures established in this contract, the Longbow PMO will be able to utilize MDHS data bases to obtain selected information concerning:

- contract deliverables
- electronic technical manual development data
- technical data

Joint utilization of these data bases will significantly reduce the time length for the receipt and reviewing of contract deliverables and the transmission of technical data and electronic technical manual information between the PMO and the contractor.

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IPPM SUCCESSFUL PRACTICES SURVEY
AH-64D LONGBOW APACHE PROJECT MANAGEMENT OFFICE
10 DECEMBER 1996

IPPM APPLICATION AREA: Meeting Techniques

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Meetings

DISCUSSION: The Longbow Apache IPTs adhere to the following protocols in the conduct of its meetings:

- All IPT members receive an introductory briefing to assure all participants have a full understanding of the IPT mission and functions and their roles and responsibilities in the IPT process.

- Primary and alternative members are designated to improve attendance at IPT meetings.

- Formal meeting agendas are required.

- Co-location of matrix support IPT members significantly improve communications.

- IPT members receive timely copies of all documentation pertinent to the agenda of the forthcoming IPT meeting.

- Each IPT member is empowered with full authority to act for his or her parent agency in support of the IPT process.

- IPT members are encouraged to identify pertinent issues at the earliest opportunity to assure timely resolution.

- Detailed minutes of IPT meetings summarizing topics discussed, status of issues, and previously assigned action items, are distributed to all IPT participants within two weeks after a meeting

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IPPM SUCCESSFUL PRACTICE SURVEY
PALADIN PROGRAM MANAGEMENT OFFICE
18 DECEMBER 1996

IPPM APPLICATION AREA: **Meeting Techniques**

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Communication

DISCUSSION: Excellent communications between the Paladin PMO, ARDEC, Letterkenny Army Depot, DCMC/DCAA and UDLP were key to the initial and continuing success of the Paladin Program.

Quarterly Management Reviews, weekly e-mail, production reports, the use of electronic communications and video teleconferencing between all of the team members are some of the tools that support the IPPM/IPT.

Excellent communications have led to the elimination of obstacles to production schedules by establishing Point Teams that studied and evaluated potential problems and developed work-arounds that avoided these work stoppages. All of the people were involved, from the Executive Team down to the Point Team.

Communication between the Paladin PMO and the various Defense Logistics Agency (DLA) organizations have led to minimal disruptions of part deliveries to the Letterkenny Army Depot (LEAD) production line for DLA-supplied parts. At the onset of the Paladin program, Industrial Forecasting Support Groups (IFSGs) were set up at each DLA center responsible for Paladin parts. This was done in order to achieve a concerted effort in the buying of these parts in accordance with the forecasted production requirements. These groups have operated effectively, with monitoring by the PMO, purchasing parts that were critically needed by LEAD as needed.

Quarterly Management Reviews for all IFSG groups are conducted in the PM-Paladin Office and e-mail/cc-mail is used extensively between these major reviews by all the organizations needing to communicate.

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IPPM SUCCESSFUL PRACTICES SURVEY
PATRIOT ADVANCED CAPABILITY - 3 (PAC-3) PROGRAM MANAGEMENT OFFICE
22 NOVEMBER 1996

IPPM APPLICATION AREA: **Meeting Techniques**

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Communication

DISCUSSION: Essential tools for the IPTs:

- Professional team facilitators/consultants
- Dedicated video teleconferencing facility
- Healthy TDY budget
- E-mail
- Contractor Integrated Technical Information Service (CITIS)
- Adequate conference rooms

IPT members have full access to CITIS (but no drawings) and expect access to the Multi-user Engineering Change Proposal (ECP) Automated Review System (MEARS) when low rate initial production gets underway.

IPT members use e-mail and video teleconferencing to pass information and to participate in weekly meetings.

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IPPM SUCCESSFUL PRACTICES SURVEY
SECURE MOBILE ANTI-JAM RELIABLE TACTICAL TERMINAL (SMART-T)
PROJECT MANAGEMENT OFFICE
7 JANUARY 1997

IPPM APPLICATION AREA: Meeting Techniques

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Communication

DISCUSSION: The IPT established a procedure that allowed any team member to bring issues or tasking to the table. The IPT shares information at meetings and through extensive use of electronic media (e-mail, CaLANdar, project schedule software, etc.). Open communication is the norm.

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IPPM SUCCESSFUL PRACTICES SURVEY
SENSE AND DESTROY ARMOR (SADARM) PROJECT
MANAGEMENT OFFICE
3-4 DECEMBER 1996

IPPM APPLICATION AREA: **Meeting Techniques**

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Communication

DISCUSSION: The SADARM PM indicated that a very positive result of the IPPM/IPT effort has been a marked increase in overall program communications, primarily Government to contractor and Government to Government (i.e., PM to DCAA and to DCMA).

Communications and personal interaction within the PMO, the contractors, Aerojet (prime) and Alliant Technical Systems, and the other Government agencies, DCAA and DCMA are maintained primarily through weekly Video Teleconferences (VTC), daily contacts, the use of Action Items and "read aheads" provided prior to the more formal meetings. These tools save valuable time by reducing travel and save dollars.

Better communications have led to better understanding of a problem and keeps it under control. This approach keeps all the team players totally involved and goes beyond the IPPM Team and becomes ingrained in the organization.

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IPPM SUCCESSFUL PRACTICES SURVEY
SINGLE CHANNEL ANTI-JAM MANPORTABLE (SCAMP)
PROJECT MANAGEMENT OFFICE
9 JANUARY 1997

IPPM APPLICATION AREA: Meeting Techniques

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Meetings

DISCUSSION: The SCAMP IPT methodology consisted of the following techniques and practices:

- A small member (six-nine person) core IPT co-located in office spaces in close proximity to the Project Team Leader works best and is more easily managed.

- The IPT leader must diligently and consistently apply all IPT operational principles, i.e., assuring that all involved IPT members are invited to scheduled events and that there is full and open discussion and communication between all members.

- The IPT is urged to manage their product and resolve issues through team consensus. When unable to reach a consensus on a particular issue, the team is expected to develop possible alternatives and provide them to the PM for a decision. The PM is also kept informed of all issues that affect cost, schedule and performance, and the team's recommended actions or resolutions.

- Prior to the close of IPT meetings, members are expected to express their understanding of a particular issue/problem and the desired actions for resolution. This technique helps to assure all IPT members share a common understanding of the problem/issue and the desired outcome.

- IPT leadership places much importance on the need for each member to have a good understanding of his or her functional area and pro-actively participate in team activities.

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IPPM SUCCESSFUL PRACTICES SURVEY
TUBE LAUNCHED OPTICALLY TRACKED WIRE GUIDED (TOW) MISSILE
IMPROVED TARGET ACQUISITION SYSTEM (ITAS)
PROGRAM MANAGEMENT OFFICE
21 NOVEMBER 1996

IPPM APPLICATION AREA: **Meeting Techniques**

SUCCESSFUL PRACTICE: X **INFORMATION**: **PROBLEM:**

DESCRIPTION: Communication

DISCUSSION: The use of video conferencing has reduced the need for formal reviews. Formal Program Reviews with the contractor occur semi-annually rather than monthly. The contractor prepares fewer deliverables because the Government has ready access to information as it develops. To reduce costs further the Government requests only one copy of each deliverable. Paper reports and other paper deliverables are nearly at zero now.

FEE members from the key functional organizations such as the MICOM Production Engineering Division, Acquisition Center or Product Assurance Directorate now have access to the PM, Close Combat Anti-Armor Weapon Systems (CCAWS) Local Area Network (LAN). The FEE member from MICOM's Production Engineering Division, for example, has access permission to files that are found on a common hard drive or work space. He also uses CaLANdar (trademark) to post meeting notices and to answer meeting notices posted by others.

Video conferencing is also used monthly to track overall program costs. The WBS is used to track the expenditures. The contractor prepares the cost performance report that shows expenditures for each WBS element and reviews it with a Government FEE member assigned to track expenditures for each element.

No problems have arisen concerning proprietary information as a result of using teleconferencing. The emphasis is on the use of non-proprietary commercial technology. There is no proprietary process involved in the production of the ITAS except for the Standard Advanced Dewar Assembly (SADA II), a Government Furnished Equipment (GFE) from PM FLIR. The SADA II was developed under a separate contract and used by ITAS.

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IPPM SUCCESSFUL PRACTICES SURVEY
WIDE AREA MUNITIONS (WAM) PROJECT
MANAGEMENT OFFICE
2 DECEMBER 1996

IPPM APPLICATION AREA: Meeting Techniques

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Communication

DISCUSSION: Daily interaction and the need for real-time review/evaluation of data forged the requirement for shared Government/contractor databases. The IPT realized shared databases as a tool for streamlining contractor deliverables, prompt review and evaluation of documents and rapid sharing/distribution of information.

Technical and cost data, test data, procurement information and other information are all shared electronically. The IPTs currently utilize this information in their decision making process in evaluating contractor performance and negotiating contract modifications.

Shared data has proven to be a valuable tool employed by the IPPM/IPT team members. The implementation of this effort was so successful that five members of the WAM IPT were recommended for the Secretary of the Army Award for Achievement in Materiel Acquisition Requirements in October 1996.

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IPPM SUCCESSFUL PRACTICES SURVEY
ABRAMS TANK SYSTEM PROJECT MANAGEMENT OFFICE
18 DECEMBER 1996

IPPM APPLICATION AREA: Decision Making

SUCCESSFUL PRACTICE: X **INFORMATION**: **PROBLEM**:

DESCRIPTION: Empowerment

DISCUSSION: The Abrams PM office feels that an IPT member should come to the meeting with the authority to commit his/her respective office to a decision. Too many times decisions have been subsequently reversed by someone in a higher position at a much later date/meeting. This is very time consuming, non-productive, and costly to the program as well as coordinating offices.

The Abrams PM office wants the IPT member to do one of several things:

- Come to the meeting with the parent office's approval for that representative to have the authority to commit their office to a specific decision.

- Indicate that they do not have complete authority and immediately raise the issue to the next higher authority and get their position. Then return with either a concurrence, non-concurrence, or an alternative position.

- Ask for a replacement member who is empowered to make decisions for that office. (This would be the exception rather than the rule.)

It is not the objective of the Abrams PM office to make other members bend to the PM's position, but to make sure that decisions are made in a timely manner and not reversed at a later date.

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IPPM SUCCESSFUL PRACTICES SURVEY
BRADLEY FIGHTING VEHICLE SYSTEM PROJECT
MANAGERMENT OFFICE
19 DECEMBER 1996

IPPM APPLICATION AREA: **Decision Making**

SUCCESSFUL PRACTICE: X **INFORMATION**: **PROBLEM: X**

DESCRIPTION: Empowerment

DISCUSSION: The PM, Bradley indicated that some IPT decisions had been reversed weeks or months down the line because an outside team member was not empowered to make a decision. Without empowered team members, a lot of time and energy is wasted by the IPT when their decisions are reversed by a higher level representative at a subsequent meeting.

As a result, PM, Bradley believes each team member should be empowered to make a decision. Ideally, the office chief or deputy should represent his respective office. Another representative, however is acceptable if he explains his limitations, i.e., immediately saying that the decision is above him and that he has to return to his office and get an answer. If that member goes back to his office and comes back with a position that either agrees or disagrees with the decision at the IPT, then this can be dealt with. The answer does not have to be the same as the PM's, but it has to be clearly stated so that a final resolution can be made.

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IPPM SUCCESSFUL PRACTICES SURVEY
RAH-66 COMANCHE PROJECT MANAGEMENT OFFICE
13 DECEMBER 1966

IPPM APPLICATION AREA: Decision Making

SUCCESSFUL PRACTICE: X **INFORMATION :** **PROBLEM:**

DESCRIPTION: Technical Performance Measurement (TPM)

DISCUSSION: TPM is a management system used by the IPT to focus management's attention on critical elements of the program to enhance the decision making process. It measures and reports on the performance of critical technical parameters over time. This helps identify potential problems and issues early in the development process so that corrective actions can be taken. TPM provides integrated program visibility of all aspects of actual versus planned technical performance.

The TPM system provides for selecting, monitoring, assessing, and resolving variances of technical characteristics during the definition, design, development and test processes.

TPMs are selected based upon their major effect on the following:

- major effect on cost or effectiveness
- major effect on weapon system/system/subsystem specifications
- high risk/cost/complexity
- extent of quantifiable parameters by test or analysis.

TPMs are reported on a standard format that includes the following:

- specification or allocated requirement correlated to Comanche specifications
- design goal
- current estimate
- responsible individual
- significant milestones traceable to the cost schedule control system.

TPMs provide visibility on the achievement of the program requirements. They provide visibility to activate other management systems and disciplines, as required, such as risk management.

TPM values are updated quarterly and reviewed at Program Integration Reviews (PIRs).

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IPPM SUCCESSFUL PRACTICES SURVEY
COMMAND AND CONTROL VEHICLE (C2V) PROJECT MANAGEMENT OFFICE
20 NOVEMBER 1996

IPPM APPLICATION AREA: **Decision Making**

SUCCESSFUL PRACTICE: X **INFORMATION**: **PROBLEM**:

DESCRIPTION: Empowerment

DISCUSSION: An issue with empowerment surfaced when a decision at the IPT meeting was incorporated into the package for the LRIP ASARC, only to have a senior representative reverse the IPT position at a much later meeting. This throws the whole process into a time delay and causes undue restrictions on the decision process and delays the program.

Some outside offices view empowerment as a means for the PM office to overrun another office. This however is not the case - the emphasis is in getting the correct position of the IPT member representing that office in a timely manner.

Limited empowerment by a member is acceptable, if the member indicates immediately that he cannot make a particular decision and that he will have to return to his parent organization to get a final decision. The member must return to the next meeting or in a timely manner with a position to resolve the issue. If there is a disagreement, then it is really necessary for that office to return with its clarified position and also with a workaround solution. It is essential to have a high level of representation and empowerment when there is a need for bargaining and compromise.

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IPPM SUCCESSFUL PRACTICES SURVEY
SECURE MOBILE ANTI-JAM RELIABLE TACTICAL TERMINAL (SMART-T)
PROJECT MANAGEMENT OFFICE
7 JANUARY 1997

IPPM APPLICATION AREA: Decision Making

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Empowerment

DISCUSSION: The Project Office was restructured from a hierarchy organization to self directed teams that operated with a firm set of objectives with authority and empowerment to control those processes within their teams. PM guidance empowered the IPT to make all decisions with full authority unless the decision impacted cost, schedule or performance. The Program Manager directed that he be informed of all decisions impacting cost, schedule or performance.

Since the program was always under so much scrutiny from DOD leadership, the team utilized risk assessments, analyzed alternatives, and developed contingency plans in the decision making process. The Milstar PM and Deputy PM previously established a PM culture to utilize criteria matrices in the decision making process so this approach was utilized by the SMART-T IPT.

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IPPM SUCCESSFUL PRACTICES SURVEY
SECURE MOBILE ANTI-JAM RELIABLE TACTICAL TERMINAL (SMART-T)
PROJECT MANAGEMENT OFFICE
7 JANUARY 1997

IPPM APPLICATION AREA: Decision Making

SUCCESSFUL PRACTICE: X **INFORMATION:** **PROBLEM:**

DESCRIPTION: Conflict Resolution

DISCUSSION: There was a very high level of cognitive conflict or simple conflict among team members who argued over their position on issues. Rarely did any ego conflict occur and when it did occur other team members stepped in and were quick to keep the team focused. Program objectives drove the achievement of consensus over functional alliances.

The IPT established various conflict resolution solutions when consensus could not be established. One such example was the formation of a "Super Team". When there were unresolved problems, the issue would be surfaced to a "Super Team", composed of the three functional division chiefs within PM Milstar. This "Super Team" would provide the SMART-T IPT their recommendations to resolve the conflict. The IPT could either accept or reject the recommendations of the "Super Team" but rejecting the recommendation meant either surfacing the issue to the Milstar Project Manager or returning to the IPT table for further discussion. On almost every instance the team was able to eventually establish consensus. To date, the team has only utilized the "Super Team" once. Members were reluctant to utilize this procedure since they felt it diminished the overall authority of the team.

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IPPM SUCCESSFUL PRACTICES SURVEY
UH-60 BLACKHAWK PROJECT MANAGEMENT OFFICE
20 NOVEMBER 1996

IPPM APPLICATION AREA: Contract Support

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: Blackhawk UH-60 Commercialization IPT

DISCUSSION: The current five-year multi-year BLACKHAWK production contract ended in FY96 and deliveries will be completed by mid-year 1997. A BLACKHAWK UH-60 Commercialization IPT was formed to reduce costs on the follow-on production contract. IPT membership included Army, Air Force, Navy representatives and interfacing contractor IPT personnel. Beginning IPT efforts involved a detailed independent review of the current production contract by both the Government and the contractor. The goal of these reviews was to identify areas where the application of commercial practices would reduce costs. Weekly IPT reviews were held to resolve differences and arrive at mutually acceptable terms and conditions. The results obtained from the joint review were then used to draft and coordinate a streamlined commercialized follow-on production contract acceptable to the Government and the contractor.

Benefits obtained to date from using the IPT methodology to plan and prepare the follow-on production contract include:

- application of performance based specifications resulting in reduced contract complexity
- 197 military specifications and standards deleted
- 39 Contract Data Requirements List (CDRL) deleted
- International Standards Organization (ISO) 9000 invoked to replace Mil-Q-9858A
- commercial warranty provisions obtained
- RFP preparation time reduced.

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IPPM SUCCESSFUL PRACTICES SURVEY
UH-60 BLACKHAWK PROJECT MANAGEMENT OFFICE
20 NOVEMBER 1996

IPPM APPLICATION AREA: Contract Support

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: Teamhawk IPT

DISCUSSION: The Teamhawk IPT was a specialized IPT formed with the goal of maximizing commonality among various model UH-60 helicopters assigned or destined to be assigned to a wide variety of customers. Customers included Army, Navy, Air Force, Coast Guard, FMS clients and contract activities. Teamhawk IPT members representing their various activities met periodically to review Blackhawk acquisition, engineering and logistics plans and actions which impacted their specific program(s).

Benefits gained from the Teamhawk IPT methodology were:

- reduced unique design changes resulting in increased commonality of design
- increased commonality of repair parts
- fewer technical manual changes and reduced technical data requirements
- simplification of maintenance procedures
- reduction of specialized/support equipment
- overall program cost reduction to all participants.

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IPPM SUCCESSFUL PRACTICES SURVEY
AH-64D LONGBOW APACHE PROJECT MANAGEMENT OFFICE
10 DECEMBER 1996

IPPM APPLICATION AREA: Contract Support

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: AH-64D Remanufacture and the Fire Control Radar (FCR) Lot II Production Contracts

DISCUSSION: The Longbow PMO formed individual IPTs to support two major production contracts. The first contract is a five-year multi-year contract with McDonnell Douglas Helicopter Systems (MDHS) for the remanufacture and follow-on interim support of 232 AH-64D aircraft. The second contract with Longbow Ltd. Liability Company (LBL) is for the production of 10 FCRs (II) for installation on the Longbow. IPTs include contractor membership as well as Government representation from the interested activities. Through a series of periodic meetings the Government more accurately described their contract requirements to MDHS and MDHS obtained a better and more rapid understanding of the Government needs. Attributes attained through use of IPT methodology in the AH-64D remanufacture contract include:

- contractor configuration management of the product baseline
- interim contractor support for five years on Longbow unique items
- performance based warranties
- performance based payment schedule
- economic price adjustment provisions
- Government/contractor savings incentive provisions
- through exploration of IPT generated options, the Government was able to obtain an additional 50 aircraft remanufactured sooner.

The goal of the FCR IPT is to reduce the time and expense to contract for the FCR by better preparing the Government and LBL for final evaluation and negotiations. To this end, the FCR IPT developed a Business Memorandum of Agreement for the Lot II contract. This agreement reflects the desires of the Government and LBL to affect a cultural change in the way FCR requirements are communicated to LBL and in the way and time period in which proposals are prepared, evaluated, negotiated, and awarded. Ultimately these procedures will shorten proposal preparation and evaluation time. This IPT and lessons learned therein will serve as the baseline for a subsequent IPT responsible for definition, implementation, and execution of a planned six-year multi-year contract for the remaining 207 FCRs.

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IPPM SUCCESSFUL PRACTICES SURVEY
PALADIN PROGRAM MANAGEMENT OFFICE
18 DECEMBER 1996

IPPM APPLICATION AREA: **Contract Support**

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: Contract Award

DISCUSSION: In establishing the FY97/98 Pricing Initiative Agreement, all involved parties, worked closely together in a concentrated effort resulting in a timely agreement and a well-prepared and evaluated cost agreement for the contract award for the FY97 and FY98 requirements. The team included representatives from ARDEC, DCAA, DCMC, and the contractor, United Defense Limited Partnership (UDLP).

The IPT greatly facilitated the SOW definition and expedited the contract award. This approach proved to be extremely effective in this sole source award because the IPT approach allowed all parties to reach resolutions of real and potential problems, expedite the entire process, identify trade-offs and reach the contractual price.

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IPPM SUCCESSFUL PRACTICES SURVEY
SENSE AND DESTROY ARMOR (SADARM) PROJECT
MANAGEMENT OFFICE
3-4 DECEMBER 1996

IPPM APPLICATION AREA: Contract Support

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: Reduction of Procurement Lead Time

DISCUSSION: Normal procurement lead time averages six to 12 months. This excessive time results from the process being a "series" effort: the Government develops the SOW and sends it out to the contractor for the contractor to prepare a proposal; the contractor then sends it back to the Government for evaluation; the Government auditors get the document in order to apply labor rates and overhead; and then the Government calls the contractor in for contract negotiations.

The SADARM PMO used the IPPM/IPT technique that puts all of these efforts in parallel. This resulted in an estimated reduction in lead time of three to six months.

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IPPM SUCCESSFUL PRACTICES SURVEY
SINGLE CHANNEL GROUND AND AIRBORNE SYSTEM (SINCGARS)
PROJECT MANAGEMENT OFFICE
9 JANUARY 1997

IPPM APPLICATION AREA: Contract Support

SUCCESSFUL PRACTICE: **INFORMATION:** X **PROBLEM:**

DESCRIPTION: Acquisition Strategy Development

DISCUSSION: The Tactical Radio Communication PM formed the SINCGARS IPT and assigned an IPT leader to develop a new acquisition strategy for the FY97 radio production contract. The objective of the IPT was to analyze the current acquisition strategy that apportioned radio production quantities between "leader and follower" producers and explore an alternate acquisition strategy that could yield production cost savings. IPT membership included representation from the user, test, developer and maintainer communities. The IPT investigated and analyzed the various issues involved but were unable to reach a consensus on a single "best acquisition strategy". With further team deliberations the rationale for alternate acquisition strategies was developed and presented to the PM for a decision.

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IPPM SUCCESSFUL PRACTICES SURVEY
UH-60 BLACKHAWK PROJECT MANAGEMENT OFFICE
20 NOVEMBER 1996

IPPM APPLICATION AREA: Design/Development Reviews

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: Blackhawk UH-60Q IPT Modification Project

DISCUSSION: The UH-60Q IPT was formed to manage the accomplishment of the two year integration and qualification phase of the UH-60Q. The IPT consisted of an unusually large number of long term members with diverse skills and specialties as well as a wide range of expected customer activities. Membership included the Army medical community, the U.S. Army Aviation Center (USAAVNC), engineering, quality, logistics, test and evaluation, avionics, human factors and DA/DOD personnel as well as interfacing contractors and subcontractors.

Benefits realized to date from use of IPT methodology include:

- shorter time length to create and coordinate the RFP
- more rapid resolution of problems
- earlier consensus on decision processes
- rapid turn-around time for reviewing competitive source selection packages and technical data
- reduction in quantity of deliverables and concurrent review of deliverables by all disciplines
- shortened schedules for task/sub tasks completion
- reduced IPT-contractor coordination time gained through use of electronic minutes of meetings.

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IPPM SUCCESSFUL PRACTICES SURVEY
RAH-66 COMANCHE PROJECT MANAGEMENT OFFICE
13 DECEMBER 1996

IPPM APPLICATION AREA: Design/Development Reviews

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: Program Review Support

DISCUSSION: Program reviews dedicated by the Comanche Integrated Master Plan/Integrated Master Schedule (IMP/IMS) utilize the IPPM methodology. These reviews provide the foundation to establish compliance with system requirements and range from technical system and segment level reviews to a series of informal technical reviews concerned with a specific segment or task element of the WBS that involve only a few Government and contractor personnel.

The technical reviews include:

- Software Specification Review (SSR)
- Preliminary Design Review (PDR)
- Critical Design Review (CDR)
- Interim Progress Review (IPR)
- Test Readiness Review (TRR)
- First Flight Design Review (FFDR)

All reviews are held between the prime contractor (Boeing/Sikorsky) and subcontractors/vendors as necessary.

The periodic program/hardware reviews conducted with the subcontractors/vendors supplying complex hardware/software include:

- costs and schedule status
- vendor plans for aircraft equipment, software, test equipment, related testing and supportability
- technical performance and risk assessments
- status of change approval and implementation
- hardware and facility inspections and demonstrations
- problem areas, alternatives, proposed solutions and potential impacts.

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IPPM SUCCESSFUL PRACTICES SURVEY
ENHANCED FIBER OPTIC GUIDED MISSILE (EFOGM)
PROGRAM MANAGEMENT OFFICE
20 NOVEMBER 1996

IPPM APPLICATION AREA: **Design/Development Reviews**

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM**:

DESCRIPTION: Design Requirements

DISCUSSION: The PM locked down the second phase of the design effort in December 1996. This was possible because of an IPPD conducted Design Review (DR2) held in September 1996. The PM purposely used the prime contractor's format to save time and dollars during the review.

Government and contractor members worked side by side on a daily basis. Formal reviews, when they are held, constitute management and decision updates of the status of mutually shared progress.

The result of using the IPT methodology is illustrated by comparing the previous NLOS FSD effort in which a total of 26 months (Dec 88 - Jan 90) was consumed and the PDR was still incomplete. In the present effort, which has only been under contract for 11 months, the equivalent Design Review #1 is expected to be completed within 30 days, a schedule savings of more than 15 months.

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IPPM SUCCESSFUL PRACTICES SURVEY
AH-64D LONGBOW APACHE PROJECT MANAGEMENT OFFICE
10 DECEMBER 1996

IPPM APPLICATION AREA: Design/Development Reviews

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: Longbow Apache Milestone III Decision Review

DISCUSSION: The Army initiated planning for the Longbow Apache Milestone III Decision Review (MDR III) using the guidance in DoD Directive 5000 series acquisition requirements dated February 1991. Prior to the scheduled review however, an Army Assistant Secretary, Research, Development, and Acquisition formed an MS III Ad-Hoc Working Group (AHWG) and issued a Letter of Instruction (LOI) calling for AHWG participation in the MDR III process. The LOI identified representatives from the ASARC principals, the DA staff, designated Army agencies, the Longbow Apache PMO, Longbow Hellfire PMO, PEO, Aviation, and PEO, Tactical Missiles. The PEO, Aviation, was designated as the Chairman of the AHWG. The AHWG was tasked to review and coordinate guidance with their respective organizations.

Subsequently, at the direction of OSD, the AHWG was expanded to include representation from the OSD staff and DAB principal. The AHWG was renamed the Longbow MS III IPT and an OSD co-chairman was designated. The OSD members were integrated into the previously established meeting process. Joint participation by DA and OSD staff representatives utilizing IPT and OIPT methodology greatly facilitated and accelerated the MDR III preparation process and resulted in the following:

- accelerated milestone documentation review process
- elimination of a formal ASARC and separate OSD document review
- elimination of a formal Defense Acquisition Board (DAB) review
- a favorable MDR III decision for production.

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IPPM SUCCESSFUL PRACTICES SURVEY
PATRIOT ADVANCED CAPABILITY - 3 (PAC-3) PROGRAM MANAGEMENT OFFICE
22 NOVEMBER 1996

IPPM APPLICATION AREA: **Design/Development Reviews**

SUCCESSFUL PRACTICE: **INFORMATION**: X **PROBLEM**:

DESCRIPTION: Initial Production Readiness Reviews (IPRR)

DISCUSSION: In the past, an IPRR team consisted of select Government reviewers who might not have been involved with the program review. Their knowledge of the technologies being applied or program management issues were limited. The PM endorsed a novel approach for the IPRR of the PAC-3 Program. The PAC-3 was already engaged in IPTs as the IPRR approached. It was a good time to redefine the old PRR culture and make it a part of the streamlined acquisition process.

Senior personnel of MICOM and Lockheed Martin Vought Systems (LMVS), the prime contractor, co-led each team. The IPRR team co-leaders drew the team membership from the IPTs. The co-leaders tailored the composition of the team to each site. Each team had a one to one ratio (almost) of Government and contractor members. The co-leaders usually paired a Government employee with an LMVS employee to review a functional area, e.g., quality or design.

The teams visited 15 production sites. At the end of every visit, the team members presented an out briefing to the personnel at the site. The IPRR team recorded and sent written concerns to the responsible IPT for resolution.

Before the IPRR visits started, the co-leaders provided orientation training in Dallas, TX and Huntsville, AL. They distributed a list of potential questions applicable to assessing production readiness to all team members. With the assistance of the University of Alabama, Huntsville, AL, they provided the team members an Internet access to a database that identified the membership, travel arrangements, meeting schedules, concerns and concerns tracking.

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IPPM SUCCESSFUL PRACTICES SURVEY
RAH-66 COMANCHE PROJECT MANAGEMENT OFFICE
13 DECEMBER 1996

IPPM APPLICATION AREA: Lessons Learned

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: Implementing IPT Methodology

DISCUSSION: Lessons learned while converting to the IPT organizational methodology are as follows:

- IPT philosophy takes leadership from the top.

- Need to constantly work at improving team communications/integration
  - The "I" in IPT is Integrated, not Independent
  - Vertical and Horizontal integration is critical
  - Business (Finance/Contracts) needs to be closely integrated.

- Functionals must clearly understand their roles and responsibilities.

- Best to involve all stakeholders who have an interest in the outcome.
  - PMO, Contractors, Suppliers, Users, DCMC and OSD

- Training to function as a team is paramount.
  - Empowerment means enabling, not stonewalling

- An integrated network of communications/software tools is mandatory.

- IPT goals and objectives must be established and tracked!!!
  - Ensure all team members participate in decisions
  - Develop meaningful team metrics

- There is no substitute for open dialogue.
  - Communicate, communicate, communicate!!!!!

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IPPM SUCCESSFUL PRACTICES SURVEY
OH-58 KIOWA WARRIOR PROJECT MANAGEMENT OFFICE
21 NOVEMBER 1996

IPPM APPLICATION AREA: Product Supportability/Safety

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: Kiowa Warrior Aircraft Safety

DISCUSSION: The Defense Acquisition Executive Summary (DAES) alleged that the Kiowa Warrior helicopter was unsafe based upon a high accident history. As a result, the PM formed an IPT to investigate the allegation and resolve the problem(s). IPT membership included representatives from the Aviation Safety Center, the U.S. Army Materiel Systems Analysis Agency (AMSAA), DA, ATCOM, the U.S. Army Aviation Center (USAAVNC), and involved contractor representatives. The Kiowa Warrior PM chaired an Executive Steering Group (ESG) which established IPT goals and provided an operational charter.

The IPT conducted an in-depth investigation and analysis of all causal factors contributing to the high accident rate, including the operational environment, aviator helicopter training methods and procedures, aviator operational situation awareness, engine reliability, and helicopter airframe safety provisions. The findings of the IPT resulted in several recommended improvements to include:

- revised aviator training methods
- revised helicopter operational procedures
- development of a Safety Enhancement Plan (SEP) featuring:
  - Full Authority Digital Electronic Control for the engine
  - improved crashworthy seats
  - a Cockpit Airbags System (CABS)
  - an Inflatable Body and Head Restraint System (IBAHRS)

When implemented, these changes will ultimately reduce the aviator's workload and improve the performance and safety of the helicopter.

The IPT also identified and substantiated engine reliability improvements that would result in a $213M savings over a 10 year period. Unfortunately however, these improvements are currently unfunded.

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IPPM SUCCESSFUL PRACTICES SURVEY
OH-58 KIOWA WARRIOR PROJECT MANAGEMENT OFFICE
21 NOVEMBER 1996

IPPM APPLICATION AREA: Product Supportability/Safety

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: Kiowa Warrior Live Fire Test and Evaluation

DISCUSSION: A congressional mandated statutory requirement (10 USC 2366) for the conduct of a Live Fire Test and Evaluation was imposed late in the Kiowa Warrior program after the original design had been established and approved. Recognizing there would be little chance for successful test results if the helicopter, as designed, was subjected to the desired live fire regime, an IPT was formed to study the problems and conditions inherent with conducting such a test. IPT membership included representatives of all the interested activities including DA and OSD. Using IPT methodology, the team was successful in establishing and gaining approval for an alternate test plan that involved a reduced level of test firing.

Considering the findings and recommendations of the IPT, the Kiowa Warrior program was successful in staffing a plan for critical component testing rather than full aircraft testing. This approach reduced the planning cost estimate by $20M, avoiding the loss of several fully mission equipped aircraft, while still complying with the mandated congressional requirement.

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IPPM SUCCESSFUL PRACTICES SURVEY
PALADIN PROGRAM MANAGEMENT OFFICE
18 DECEMBER 1996

IPPM APPLICATION AREA: **Product Supportability/Safety**

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: Just-In-Time Inventory

DISCUSSION: The Government/Defense Supply System is geared to provide repair parts and materials to customers on a demand basis and works very well in normal re-supply operations. The system, however, is less efficient in a production environment.

Parts are needed early in order to maintain a "just-in-time" inventory common to production plants and most commercial contractors manufacturing items under Government contract. The potential of production down time had to be avoided.

To avoid the possibility of down time, due to lack of sufficient parts availability, Point Teams were established to identify and resolve problems of this nature. By utilizing these teams and through cooperation, communications and teamwork, parts were identified, lead times were determined, availability of parts were projected, and schedules were maintained.

The IPT Point Team determined that in order to maintain a smooth flowing production schedule, parts were required to be on hand approximately one month prior to actual use. Simply relying on the normal parts supply flow would have resulted in work stoppages and delays in scheduling resulting in additional costs and increased production lead times. The IPPM/IPT approach, involvement and teamwork resolved this potential problem before it could develop.

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IPPM SUCCESSFUL PRACTICES SURVEY
PALADIN PROGRAM MANAGEMENT OFFICE
18 DECEMBER 1996

IPPM APPLICATION AREA: **Product Supportability/Safety**

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: Benefits Using IPT Methodology

DISCUSSION: The Paladin PMO identified and documented several benefits that were realized through the IPT approach. The major benefits included:

- streamlined and defined organizational roles and responsibilities
- development and implementation of alternatives to conflicting Government regulations
- streamlined parts and material flow to the production lines
- process flow improvements that reduced cost, enhanced quality, and reduced schedule risks
- improved repair parts availability and cost reduction opportunities introduced to Letterkenny Army Depot (LEAD).

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IPPM SUCCESSFUL PRACTICES SURVEY
BATTLEFIELD COMBAT IDENTIFICATION SYSTEM (BCIS)
PROJECT MANAGEMENT OFFICE
8 JANUARY 1997

IPPM APPLICATION AREA: Program Cost

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: Cost as an Independent Variable (CAIV) Study

DISCUSSION: The BCIS PMO established an IPT to perform a CAIV study with the objective of reducing current BCIS unit production costs. The IPT included both Government and contractor representatives who had previously worked together on the BCIS program and were proficient in working together as a team. Government IPT members consisted of six to eight full time employees each with 15 to 20 years acquisition experience.

The IPT, utilizing a "partnering agreement", accomplished the CAIV study within two months. The study evaluated performance/cost trades and producibility enhancements to the baseline BCIS contract, focusing on these areas where significant gains could be made in a short period of time. The IPT considered a number of BCIS configurations which were defined by bounding threshold performance requirements and cost thresholds and goals. The requirements tradespace considered cost/performance trades in the area of exploitability, detectability, interoperability, digital data, size/weight/volume, and Ada software compatability. Baseline contract redesign was accomplished. IPT progress meetings were conducted every two weeks at the contractor's site.

As a result of the IPT effort, the recommended BCIS CAIV unit cost is approximately $12.1K compared to a previous EMD Design To Unit Price Cost (DTUPC) of $16.9K, a 28 percent reduction. In terms of program cost impacts, an overall program cost reduction of $35M is estimated based on an established acquisition objective. Recommended cost reductions were achieved without sacrificing critical Operational Requirements Document (ORD) requirements. The CAIV results have been coordinated with the user community and are now being coordinated with HQDA.

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IPPM SUCCESSFUL PRACTICES SURVEY
ENHANCED FIBER OPTIC GUIDED MISSILE (EFOGM)
PROGRAM MANAGEMENT OFFICE
20 NOVEMBER 1996

IPPM APPLICATION AREA: **Program Cost**

SUCCESSFUL PRACTICE: **INFORMATION**: X **PROBLEM**:

DESCRIPTION: Commercialization of Software

DISCUSSION: The EFOGM was a front runner in implementing CAIV in making decisions for contract execution. One highly visible example was the decision to incorporate a version of the Silicon Graphics, Inc.commercial computer into the tactical version of the EFOGM system. This decision was based on adherence to the Army common operating environment and the Army technical architecture, maximizing reuse of commercial off-the-shelf and Government off-the-shelf software.

The existing software for the Indigo Impact Series and its proven graphics capability for IR three dimensional scene generation made possible the cost avoidance associated with third party proprietary digital MAP software and one additional computer. This selection resulted in a net hardware cost avoidance of over $5M, a reutilization of 240,000 source lines of code, and a schedule risk avoidance of six to nine months.

The Rapid Force Projection Initiative (RFPI) Office is coordinating an Advanced Concept Technology Demonstration in 1998 of which EFOGM is a major component. In this test, the system will detect, maneuver, and engage a live opposing force with simulated fires. The PM expects to issue 300 missiles to the troops for Early User Evaluation (EUE). The troops will train in phases using mobile and stationary simulators.

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IPPM SUCCESSFUL PRACTICES SURVEY
CLOSE COMBAT TACTICAL TRAINER (CCTT)
PROJECT MANAGEMENT OFFICE
23 JANUARY 1997

IPPM APPLICATION AREA: Team Forming/ Development

SUCCESSFUL PRACTICE: **INFORMATION:** X **PROBLEM:**

DESCRIPTION: Lessons Learned

DISCUSSION: The CCTT IPTs were originally composed of six companies organized conceptually into four program area teams under an overarching SIT. All teams contained members from all companies as well as Government representatives in all functional areas.

Contractually, the Government had awarded a prime contract to IBM as the system integrator, who in turn awarded subcontracts to the remaining five companies. The type of contract varied among the contractors and the subcontractors. The Government prime contract was a Cost Plus Incentive Fee, while the subcontracts varied from Firm Fixed Price through Cost Plus Incentive Fee to Cost Plus Fixed Fee.

This mismatch between the teaming philosophy and the contractual structure of the program is seen by COL Shiflett to have been a major stumbling block to the successful participation of all companies in the teaming effort. Just as teaming is a human behavior and influenced by the environment in which team members operate, the teaming efforts on the CCTT program have been influenced by the contractual environment. The participation of each of the member companies has been affected by the different goals and motivations generated by the varied contract vehicles.

COL Shiflett suggested that future programs include, at a minimum, a pre-award review of multi-company contractor teams to verify that the contractual arrangements are in sync with the desired team structure and that they will provide appropriate incentives to foster full team participation and common goals.

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IPPM SUCCESSFUL PRACTICES SURVEY
CLOSE COMBAT TACTICAL TRAINER (CCTT)
PROJECT MANAGEMENT OFFICE
23 JANUARY 1997

IPPM APPLICATION AREA: Team Forming/ Development

SUCCESSFUL PRACTICE: **INFORMATION:** X **PROBLEM:**

DESCRIPTION: Intergroup Relations

DISCUSSION: One benefit realized by the CCTT program from using the IPT was that it formalized the allocation of functional personnel to the program.

U.S. Army Simulation and Training Command (STRICOM) is a command which normally allocates functional personnel to a wide variety of programs on an as-needed basis. This approach tends not to allow an individual to follow a single program as it assigns tasks to the personnel who are available when a need arises. This also leads to contention among programs for highly skilled functional personnel.

The process of forming the integrated development teams for CCTT allowed the PM CATT to formalize the requirement that the functional area personnel were to be dedicated full time to the program.

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IPPM SUCCESSFUL PRACTICES SURVEY
CLOSE COMBAT TACTICAL TRAINER (CCTT)
PROJECT MANAGEMENT OFFICE
23 JANUARY 1997

IPPM APPLICATION AREA: Team Forming/ Development

SUCCESSFUL PRACTICE: **INFORMATION:** X **PROBLEM:**

DESCRIPTION: Maintain a Strong Systems Engineering Approach

DISCUSSION: Mr. Edwards suggested that a team specifically tasked to address the systems engineering aspects of the program be formed early and maintained as a strong force guiding the efforts of all subordinate development teams. While the CCTT development program structure included a SIT team with subordinate development teams, examples of where a stronger systems engineering influence was needed have occurred.

An early example involved access to common simulated battlefield information. Part way into the development effort, it became apparent that the separate teams were each developing a similar code to access the same data. To prevent duplicated effort, the work in separate teams was stopped and a set of common access routines were developed for all teams to share. Later in the program, difficulties experienced during the software/hardware integration and test showed that more early attention had been needed to the task of defining and maintaining the interfaces that occur between the system components.

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IPPM SUCCESSFUL PRACTICES SURVEY
OH-58 KIOWA WARRIOR PROJECT MANAGEMENT OFFICE
21 NOVEMBER 1996

IPPM APPLICATION AREA: Team Forming/ Development

SUCCESSFUL PRACTICE: **INFORMATION:** X **PROBLEM:**

DESCRIPTION: Lessons Learned

DISCUSSION:

- IPT charter should be signed by the PM and the members of the ESG. It should provide the general plan of action and milestones for accomplishment of the goal(s).

- An IPT is desirable when :
  - multiple agencies are involved
  - many areas of expertise/disciplines are needed
  - many separate actions/functions must be performed to integrate an overall effort.

- Scheduling and tracking of team events and actions are very productive.

- Meetings should be limited to one day and utilize a formal agenda.

- ESG leader participation and motivation ensures success.

- Meeting locations should be rotated among the IPT members.

- Rules for the conduct of an IPT meeting are established, such as:
  - each member allotted an equal time to express his or her views
  - no one is permitted to raise an issue ("finger pointing") without offering at least one proposed solution
  - no one can "grade a paper"(checker/approver) unless he or she has participated in its preparation
  - problem areas are to be addressed promptly and solved as they arise. ("Don't kick the can down the alley").

The Kiowa Warrior PM found a unique way to encourage team building/cooperation during a team meeting. The IPT leader places a bowl of jelly beans in the middle of the conference table and announces that when anyone was about to become irate in their discussion with other team members, he or she should take a jelly bean from the jar instead. This would signal other members of the team that they should consider "backing off" from the approach being taken and perhaps consider other alternatives. This helped to maintain a working environment while still highlighting areas of concern.

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IPPM SUCCESSFUL PRACTICES SURVEY
SECURE MOBILE ANTI-JAM RELIABLE TACTICAL TERMINAL (SMART-T)
PROJECT MANAGEMENT OFFICE
7 JANUARY 1997

IPPM APPLICATION AREA: Team Forming/ Development

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: Social Facilitation and Polarization

DISCUSSION: There was a large degree of social facilitation among the team. Team members were expert in their functional areas and were known throughout the community for their expertise and innovation. Each member had "pet projects", (example: the contract team member was creating an electronic database retrieval and management system for groupware application between the SMART-T and industry) that enhanced overall team performance but it was something they had primary interest in. Team members promoted each other's successes and provided assistance and support to these projects that led to social facilitation among the team.

Polarization: Putting together a group of innovative team members definitely fostered polarization of liberal streamlining techniques that individuals alone probably would not have pursued. An example of this was when the team challenged DOD top official's requirements on what is determined "non value added determination". Certainly the culture that had recently been established through the DOD and within the project manager's offices contributed to team members' willingness to take risks.

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IPPM SUCCESSFUL PRACTICES SURVEY
SECURE MOBILE ANTI-JAM RELIABLE TACTICAL TERMINAL (SMART-T)
PROJECT MANAGEMENT OFFICE
7 JANUARY 1997

IPPM APPLICATION AREA: Team Forming/ Development

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM:**

DESCRIPTION: Intergroup Relations

DISCUSSION: The SMART-T IPT had many inter-group relationships that had a direct impact on its ability to be affective as a team. Since the SMART-T terminal is part of a highly visible, complex and sophisticated satellite system, the Milstar Program, the effectiveness of dealing with various inter-group conflicts had a significant bearing upon the team's effectiveness.

A large portion of the Ft. Monmouth community belongs to the Communications and Electronic Command (CECOM). Their primary responsibilities are managing non-major systems, providing logistics fielding support to PM and non-PM developed items, and providing matrix support to the various Fort Monmouth independent project manager organizations such as Milstar. The majority of non-core SMART-T IPT members resided in functional areas within CECOM. Although this organization provides support to the various PMs, they operate under a separate mission and command chain. Often their goals and objectives conflict with those being pursued by a project manager organization. Examples of the sources of conflict and the techniques utilized by the SMART-T IPT to resolve them are as follows:

SOURCE OF CONFLICT	EXPLANATION	TEHCNIQUES UTILIZED BY SMART-T IPT
Goal incompatibility	CECOM is organized by function. Policies and procedures entail supporting a wide variety of programs (broad based policies) SMART-T IPT is focused on developing and producing a satellite terminal (very focused)	Confrontation and Negotiation - Utilizing support agreements, both sides negotiated amount of support, time frames, and function
High horizontal differentiation	Two separate major chains of commands	Increase Mechanism for Communications - During source selection, both major commanders jointly made the industry selection for SMART-T
Dependence on scarce resource	CECOM is only source of support to SMART-T IPT on many functional areas. High quality CECOM functionals are in demand for other PMs and performing broad based CECOM responsibilities.	Confrontation and Negotiation - Support agreements are a give and take of personnel and their assignments

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IPPM SUCCESSFUL PRACTICES SURVEY
SECURE MOBILE ANTI-JAM RELIABLE TACTICAL TERMINAL (SMART-T)
PROJECT MANAGEMENT OFFICE
7 JANUARY 1997

IPPM APPLICATION AREA: Team Forming/ Development

SUCCESSFUL PRACTICE: **INFORMATION:** X **PROBLEM:**

DESCRIPTION: Lessons Learned

DISCUSSION: Although the SMART-T IPT is an affective team, the following "lessons learned" and recommendations are provided:

- Establish a charter for each IPT. Although the SMART-T had an Acquisition Baseline that established program objectives, the team could have utilized a charter to better understand organizational issues such as the role of the division chiefs, specific limitations imposed on the team, etc.

- Conduct teaming training: Much of the early conflict and struggle (i.e., during the "storming" stage) could have been reduced with some team training that helped team members deal with establishing decision making processes and resolving conflicts.

- Break functional alignments that hindered the team. The SMART-T IPT was able to withstand any threat on its Core Team. However, a greater role by the PM and the deputy PM in breaking the functional alignment would have been helpful.

- Establish a team reward system based upon the team's performance objective. Although the SMART-T program received a great honor by receiving the "Packard Award", a greater incentive would have resulted by providing up front incentives on team performance goals.

- Modify individual performance appraisal criteria to include team criteria. Although it is difficult to change an existing performance system, the culture is ripe within DOD to support the change of a performance appraisal system tailored toward team objectives.

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IPPM SUCCESSFUL PRACTICES SURVEY
TUBE LAUNCHED OPTICALLY TRACKED WIRE GUIDED (TOW) MISSILE
IMPROVED TARGET ACQUISITION SYSTEM (ITAS)
PROGRAM MANAGEMENT OFFICE
21 NOVEMBER 1996

IPPM APPLICATION AREA: **Team Forming/ Development**

SUCCESSFUL PRACTICE: **INFORMATION**: X **PROBLEM**:

DESCRIPTION: User Acceptance

DISCUSSION: Soldier users have been an integral part of the ITAS project. A user representative served on the Source Selection and Evaluation Board. An Early User Demonstration (August 1993) at Ft. Benning and Redstone Arsenal included appropriate Military Occupational Specialty representatives. The demonstration allowed soldiers to evaluate prototypes and concepts as a part of the path to the PDR. Ongoing Limited User Tests provide user evaluation early in the project.

A user also participates in the MWG and ESG IPT meetings.

PM POINT OF CONTACT: LTC Earl Sutton **TELEPHONE:** (205)842-5207
IEA SURVEY TEAM MEMBER: Mr. Gaylen Fischer **TELEPHONE**: (309)782-6718

IPPM SUCCESSFUL PRACTICES SURVEY
TUBE LAUNCHED OPTICALLY TRACKED WIRE GUIDED (TOW) MISSILE
IMPROVED TARGET ACQUISITION SYSTEM (ITAS)
PROGRAM MANAGEMENT OFFICE
21 NOVEMBER 1996

IPPM APPLICATION AREA: **Team Forming/ Development**

SUCCESSFUL PRACTICE: **INFORMATION**: X **PROBLEM**:

DESCRIPTION: Lessons Learned

DISCUSSION: IPTs Lessons Learned since Spring of 1996

- Government IPT members need to meet weekly.

- Communication via e-mail and video teleconferencing reduces travel expenses, reduces paper deliverables, and results in a more stable IPT membership.

- Data exchange is the biggest challenge to be overcome by the IPTs. For effective paperless transfer, user friendly software and encryption (to assure privacy) are essential.

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IPPM SUCCESSFUL PRACTICES SURVEY
WIDE AREA MUNITIONS (WAM) PROJECT
MANAGEMENT OFFICE
2 DECEMBER 1996

IPPM APPLICATION AREA: **Team Forming/ Development**

SUCCESSFUL PRACTICE: **INFORMATION: X** **PROBLEM**:

DESCRIPTION: Team Members

DISCUSSION: Procurement personnel played a significant role in the WAM IPT. The ARDEC Acquisition Center, faced with manpower shortages, scheduling and funding constraints, suggested the innovative teaming relationship between Government and contractor to expedite the acquisition process and reduce cycle time. After jointly brainstorming ideas and resolving procedural issues, the IPPM was quickly incorporated into the WAM program.

Paramount of all the items to be addressed by the team was Acquisition Streamlining. Procurement personnel participated in the successful streamlining of schedule, implementation of electronic data transfer, reduction of contractor deliverables, and the elimination of military specifications and standards, formal design reviews, and Government oversight.

Procurement personnel were also key to assuring those contract modifications and solicitations were adequately negotiated. Meeting minutes and recordings of video teleconferences are used to formally document agreements, actions and issues. The WAM was the first program in the Office of the Project Manager for Mines, Countermines and Demolitions and ARDEC to incorporate the IPPM concept and continues to serve as a model for the rest of the Army's acquisition community.

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APPENDIX D

LIST OF ACRONYMS

LIST OF ACRONYMS

ACAT	Acquisition Category
AHWG	Ad-Hoc Working Group
AIT	Analysis and Integration Team
AMC	U.S. Army Materiel Command
AMSAA	U.S. Army Materiel Systems Analysis Activity
ARL	Army Research Laboratory
ASARC	Army Secretary Acquisition Review Council
ATD	Advanced Technology Demonstration
BCIS	Battlefield Combat Identification System
BFIST	Bradley Fire Support Team Vehicle
BMDARC	Ballistic Missile Defense Acquisition Review Council
C2V	Command Control Vehicle
CABS	Cockpit Airbags System
CAD	Computer-Aided Design
CAIV	Cost As An Independent Variable
CAV	Composite Armored Vehicle
CCAWS	Close Combat Anti-Armor Weapons Systems
CCTT	Close Combat Tactical Trainer
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CE	Concurrent Engineering
CFV	Cavalry Fighting Vehicle
CID	Combat Identification
CITIS	Contractor Integrated Technical Information Service
CPA	Critical Path Analysis
CPFF	Cost Plus Fixed Fee
CSDT	Composite Structures Development Team
CSSR	Cost and Schedule Status Report
DAB	Defense Acquisition Board
DAES	Defense Acquisition Executive Summary
DARPA	Defense Advanced Research Projects Agency
DCAA	Defense Contract Audit Agency
DCMC	Defense Contract Management Command
DCS	Diagnostic Control Systems
DIS	Distributed Interactive Simulations
DLA	Defense Logistics Agency
DoD	Department of Defense
DPRO	Defense Plant Representative Office
DSREDS	Digital Storage and Retrieval Engineering Data System
DTUPC	Design To Unit Price Cost
ECP	Engineering Change Proposal
EFOGM	Enhanced Fiber Optics Guided Missile
EMD	Engineering and Manufacturing Development
EPLRS	Enhanced Position Location Reporting System
EPR	Executive Progress Review
ERC	Executive Review Committee
ESG	Executive Steering Group

EVM	Earned Value Management
FCR	Fire Control Radar
FEE	Functional Execution Element
FFDR	First Flight Design Review
FMS	Foreign Military Sales
FSD	Full Scale Development
GDLS	General Dynamics Land Systems
GFE	Government Furnished Equipment
HAB	Heavy Assault Bridge
IBAHRS	Inflatable Body and Head Restraint System
IEA	U.S. Army Industrial Engineering Activity
IFSG	Industrial Forecasting Support Group
IFV	Infantry Fighting Vehicle
IGES	Initial Graphics Exchange Standard
ILS	Integrated Logistics Support
IMP/IMS	Integrated Master Plan/Integrated Master Schedule
IOT	Initial Operational Test
IPD	Integrated Product Development
IPDP	Integrated Product Development Process
IPPD	Integrated Product and Process Development
IPPM	Integrated Product and Process Management
IPPM WG	Integrated Product and Process Management Working Group
IPR	In-Process Review
IPR	Interim Progress Review
IPRR	Interim Production Readiness Review
IPT	Integrated Product Team
ISO	International Standards Organization
JCALS	Joint Computer-aided Acquisition and Logistics Support
JPO	Joint Program Office
LAN	Local Area Network
LBL	Longbow Ltd. Liability Company
LEAD	Letterkenny Army Depot
LMVS	Lockheed Martin Vought Systems
LOI	Letter of Instruction
LRIP	Low Rate Initial Production
MCD	Mines, Countermines and Demolitions
MDHS	McDonnell Douglas Helicopter Systems
MDR	Milestone Decision Review
MEARS	Multi-user Engineering Change Proposal Automated Review System
MICOM	U.S. Army Missile Command
MICOS	Milestone Control System
MOU	Memorandum of Understanding
MWG	Management Working Group
NLOS	Non-Line Of Sight
NVSED	Night Vision and Electronic Sensors Directorate
OIPT	Overarching IPT
OPTEC	Operational Test and Evaluation Command
ORD	Operational Requirements Document
OSD	Office of the Secretary of Defense

PAC-3	Patriot Advanced Capability - 3
PAT	Process Action Team
PDR	Preliminary Design Review
PDRR	Program Definition and Risk Reduction
PDT	Product Development Team
PEO	Program Executive Officer
PERT	Program Evaluation and Review Technique
PIR	Program Integration Review
PM	Program Manager
PMM	Program Manager Meetings
PMO	Product Management Office
PMT	Program Management Team
PPR	Program Progress Review
PQT	Production Qualification Test
RFP	Request for Proposal
RFPI	Rapid Force Projection Initiative
SADA	Standard Advanced Dewar Assembly
SADARM	Sense and Destroy Armor
SAF	Semi-Automated Forces
SCAMP	Single Channel Anti-Jam Manportable
SDR	System Design Review
SEIT	Systems Engineering and Integration Team
SEP	Safety Enhancement Plan
STRICOM	U.S. Army Simulation and Training Command
SIMNET	Simulations Network
SINCGARS	Single Channel Ground and Airborne System
SIT	Systems Integration Team
SLICC	Senior Level Integrated Process Team Coordinating Council
SMART-T	Secure Mobile Anit-Jam Reliable Tactical Terminal
SOW	Scope Of Work
SSEB	Source Selection Evaluation Board
SSR	Software Specification Review
TARDEC	Army Tank-Automotive Research, Development and Engineering Center
TECOM	Test and Evaluation Command
TIM	Technical Interface Meeting
TIWG	Test and Integration Working Group
TOW ITAS	Improved Target Acquisition System for Tube Launched Optically Tracked Wire Guided Missile
TPM	Technical Performance Measurement
TRADOC	Training and Doctrine Command
TRR	Test Readiness Review
TSM	TRADOC System Manager
UASIS	U.S. Army Infantry School
UDLP	United Defense Limited Partnership
USAAVNC	US Army Aviation Center
VTC	Video Teleconferencing
WAM	Wide Area Munitions
WBS	Work Breakdown Structure
WIPTs	Working-level Integrated Product Teams